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FINAL PHASE 2 RCRA FACILITY INVESTIGATION WORK PLAN FOR OIL WATER
SEPARATORS NAS FORT WORTH TX
10/1/1999
INTERNATIONAL TECHNOLOGIES



**NAVAL AIR STATION
FORT WORTH JRB
CARSWELL FIELD
TEXAS**

**ADMINISTRATIVE RECORD
COVER SHEET**

AR File Number 489

**Final
Phase 2 RFI Work Plan for
Oil/Water Separators
Naval Air Station (NAS) Fort Worth Joint Reserve Base
Carswell Air Force Base, Texas**

Prepared for:

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Table of Contents

	Page
List of Tables	ii
List of Figures	iii
List of Acronyms	iv
1.0 Introduction	1
1.1 Project Objectives	2
1.2 Project Investigation Methods	3
2.0 Background and Existing Site Information	5
2.1 Site Description	5
2.2 Environmental Setting	5
2.3 Site History and Operation	5
2.3.1 Ownership	5
2.3.2 Operation	5
2.3.3 Results of Previous Site Investigations	6
3.0 Plan of Investigation	11
3.1 OWS Investigation Locations	11
3.2 OWS Phase 2 RFI Surface Soil Investigation	12
3.3 OWS Phase 2 RFI Subsurface Soil Investigation	13
3.4 OWS Phase 2 RFI Groundwater Investigation	13
3.5 Investigation-Derived Waste Management	15
4.0 Reporting	17
5.0 Schedule	18
6.0 Project Management	19
7.0 References	20
Tables	
Figures	

List of Tables

Table	Title	Follows Text
1	Oil/Water Separator RFI Locations	
2	Oil/Water Separator Phase 2 RFI Status Table With Recommended TNRCC Risk Reduction Program Action	
3	Analytical Soil Boring Samples	
4	Analytical Groundwater Samples	
5	Summary Table of all Soil Boring and Groundwater Samples	
6	Groundwater Field Sampling Test and Method Table	

List of Figures

Figure	Title	Follows Text
1	Site Location Map	
2	OWS Location Map	
3	Building 1015 Soil Boring and Groundwater Monitoring Locations	
4	Building 1027 Soil Boring and Groundwater Monitoring Locations	
5	Building 1060 Soil Boring and Groundwater Monitoring Locations	
6	Building 1064 Soil Boring and Groundwater Monitoring Locations	
7	Building 1101 Soil Boring and Groundwater Monitoring Locations	
8	Building 1145 Soil Boring and Groundwater Monitoring Locations	
9	Building 1190 Soil Boring and Groundwater Monitoring Locations	
10	Building 1191 Soil Boring and Groundwater Monitoring Locations	
11	Building 1194 Soil Boring and Groundwater Monitoring Locations	
12	Building 1320 Soil Boring and Groundwater Monitoring Locations	
13	Building 1414 Soil Boring and Groundwater Monitoring Locations	
14	Building 1423 Soil Boring and Groundwater Monitoring Locations	
15	Building 1602 Soil Boring and Groundwater Monitoring Locations	
16	Building 1628 Soil Boring and Groundwater Monitoring Locations	
17	Building 1643 Soil Boring and Groundwater Monitoring Locations	
18	Building 1655 Soil Boring and Groundwater Monitoring Locations	
19	Building 1656 Soil Boring and Groundwater Monitoring Locations	
20	Building 3358 Soil Boring and Groundwater Monitoring Locations	
21	Building 4146 Soil Boring and Groundwater Monitoring Locations	
22	Building 4160 Soil Boring and Groundwater Monitoring Locations	
23	Building 4210 Soil Boring and Groundwater Monitoring Locations	
24	OWS Phase 2 RFI Addendum Report Outline	
25	Project Schedule - OWS Phase 2 Investigation	
26	Project Organization	

List of Acronyms

AFB	Air Force Base
AFCEE	Air Force Center for Environmental Excellence
AOC	area(s) of concern
EPA	U.S. Environmental Protection Agency
FSP	field sampling plan
HGL	Hydrogeologic Inc.
IRP	Installation Restoration Program
IT	IT Corporation
Law	Law Environmental, Inc.
LNAPL	light nonaqueous-phase liquid
MSC	media-specific concentration
NAS	Naval Air Station Fort Worth
OWS	oil/water separator
PID	photoionization detector
PQL	practical quantification limit
QA/QC	quality assurance/quality control
QAPP	quality assurance project plan
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
RRS	Risk Reduction Standard
SAP	sampling and analysis
SPLP	Synthetic Precipitation Leaching Procedure
SVOC	semivolatile organic compound
SWMU	Solid Waste Management Unit
TCA	trichloroethane
TCE	trichloroethene
TNRCC	Texas Natural Resource Conservation Commission
UTL	upper tolerance level
VOC	volatile organic compound

1.0 Introduction

IT Corporation (IT) has been contracted by the Air Force Center for Environmental Excellence (AFCEE) to prepare a Phase 2 Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI)/addendum report to evaluate existing information, obtain additional data as needed, and prepare a Phase 2 RFI addendum work plan for 21 oil/water separator (OWS) locations at the Naval Air Station (NAS) Fort Worth Joint Reserve Base, Carswell Field, Texas. IT is performing this work under Contract F41624-94-D-8047, Delivery Order 39.

This Phase 2 RFI work plan is to provide: objectives for the additional investigation of the OWSs at NAS Fort Worth, the plan of investigation for additional field investigation of OWSs, the methods for reporting the regulatory status of each OWS in accordance with Texas Natural Resource and Conservation Commission (TNRCC) Risk Reduction Standards (RRS), and requests for no further action status and closure of selected OWSs connected to the Sanitary Sewer System (Solid Waste Management Unit [SWMU] 66). Results of work previously performed on the OWSs are provided in the draft OWS RFI addendum report (IT, 1998a). This OWS Phase 2 RFI work plan includes by reference the findings provided in the draft Sanitary Sewer System RFI report (IT, 1997a).

Additional investigation of the OWSs will comply with the requirements specified in the work plan and Quality Program Plan for the Sanitary Sewer System investigation (IT, 1997b,c,d). The Quality Program Plan includes a health and safety plan and a sampling and analysis plan (SAP). The health and safety plan is a project-specific and site-specific plan. The SAP consists of two volumes: the field sampling plan (FSP) and the quality assurance project plan (QAPP). The FSP describes the methods to be used in the collection analysis of additional site data samples. The QAPP documents the data quality objectives and the quality assurance/quality control (QA/QC) procedures to be used in the performance of field and laboratory work.

This document amends the NAS Fort Worth Sanitary Sewer System RFI work plan (IT, 1997b) and FSP (IT, 1997d) and presents the proposed sampling locations and sampling rationale. The sampling locations and analytical methods will be reviewed by the TNRCC before field work begins. This document will provide the OWS locations to be further investigated, define the

analytical samples to be collected, provide reference for sample collection methods, explain the rationale for the sample collection, and provide sufficient information to serve as the Phase 2 FSP. The work plan will be based on the modification of the existing NAS Fort Worth Sanitary Sewer System RFI work plan (IT, 1997b) and FSP (IT, 1997d) and will include:

- Locations for delineation and rationale for sampling
- Draft final OWS RFI report outline
- Provisions for Synthetic Precipitation Leaching Procedures (SPLP) sample analysis to allow RRS 2 closure of locations where soils exceed background upper tolerance level (UTL) for inorganic constituents and practical quantification limit (PQL) for organic constituents

The recently promulgated TNRCC Risk Reduction Program Rule will be compared to the RRSs to allow an evaluation of the most effective remedial alternatives for OWS. The Air Force will be presented recommendations on which program will be most effective.

1.1 Project Objectives

After completion of the Sanitary Sewer System RFI report, TNRCC comments indicated additional delineation of contaminants detected would be required for completion of the RFI. Compliance with TNRCC RRSs for completion of the OWS RFIs will require additional lateral delineation of contaminants exceeding background UTLs or analytical methods PQLs. The work plan does not include corrective measures, such as detailed contaminant delineation sampling or legal surveys of the contaminated OWS site boundaries and deed restrictions, to provide closure of the site.

The objectives of this investigation are:

- Obtain additional data necessary to adequately assess the extent of OWS-related soil and groundwater contamination for constituents detected above TNRCC RRS 2.
- Consolidate additional OWS data in a Phase 2 RFI addendum report compliant with TNRCC regulations and procedures.
- Prepare an interim corrective measures work plan for the OWSs identified, evaluate candidate technologies, and recommend appropriate remediation, if warranted.

- Prepare documents for “no further action” for the OWSs where contaminants were determined not to exceed TNRCC RRS 1.
- Prepare documents for submittal of closure in place where contaminants exceeded TNRCC RRS 1 but were determined not to pose a threat to groundwater by leaching from soils and meet closure criteria under RRS 2.
- Allow for property transfer of parcels containing the OWSs.

1.2 Project Investigation Methods

Evaluation of the analytical data from the draft Sanitary Sewer System RFI report indicates sample locations can be categorized as:

- Locations requiring further delineation
- Locations requiring sample confirmation due to detections less than one order of magnitude above RRS 1
- Locations not requiring additional delineation due to influences from comingled plumes or proven anthropogenic contaminants
- Locations not requiring additional delineation due to organic analytes not exceeding analytical method PQL or inorganic analytes not exceeding background UTLs.

The estimated number of soil and groundwater samples is based on the locations that had constituents exceeding background UTLs or PQLs. These investigation locations are divided into confirmation and delineation. These will provide both confirmation of sampling results and additional delineation of the lateral extent of contamination. Samples collected in already delineated areas (SWMUs or previously documented known spill sites) were not used in selection determination.

The basis for selection for removal of the sample locations from the Sanitary Sewer System RFI data is as follows:

- Remove organic analytes not exceeding Method PQL.
- Remove inorganic analytes not exceeding background UTLs.

Naval Air Station Fort Worth
Phase 2 RFI OWS Work Plan
Revision: 0
October 1999
Page 4 of 21

- Remove groundwater sample locations from spill sites and the Air Force Plant 4 trichloroethene (TCE) groundwater plume.
- Removal of sample locations that have contaminants suspected of anthropogenic source (polynuclear aromatic hydrocarbons from asphalt), and detections suspected to be caused by laboratory contamination, single detections of uncommon constituents that do not have an identified local industrial source.

2.0 Background and Existing Site Information

2.1 Site Description

NAS Fort Worth is located in north-central Texas in Tarrant County, 8 miles west of downtown Fort Worth (see Figure 1). A description of NAS Fort Worth and the surrounding area is provided in the NAS Fort Worth Sanitary Sewer System work plan (IT, 1997b). The OWSs are located throughout the industrialized areas of NAS Fort Worth (see Figure 2).

2.2 Environmental Setting

Description of the environmental setting at NAS Fort Worth is fully described in the Sanitary Sewer System RFI work plan (IT, 1997b).

2.3 Site History and Operations

2.3.1 Ownership

Description of the site history and ownership at NAS Fort Worth is fully described in the Sanitary Sewer System RFI work plan (IT, 1997b).

2.3.2 Operation

Before the construction of the initial airfield facilities in 1942, the area now occupied by NAS Fort Worth was pasture land and woods. The majority of the NAS Fort Worth property was acquired in the 1940s, with most of the property acquired from the city of Fort Worth in 1941. Additional property, including most of the south Base, the hospital area, and the Off-Site Weapons Storage Area, was acquired during the 1950s. Kings Branch and the south Base residential areas were acquired in 1960. Several miscellaneous additional properties totaling less than 10 acres have been acquired since 1970 (Jacobs Engineering, 1995a,b).

From 1942 until 1994, the former Carswell Air Force Base (AFB) and its Army predecessors served as a bomber and bomber training base. Carswell AFB was realigned as NAS Fort Worth in 1994. Wastes have been generated and disposed of at the facility since the beginning of industrial operations in 1942. The major industrial operations at NAS Fort Worth included: maintenance of jet engines, aerospace ground equipment, fuel systems, weapons systems, and

hydraulic systems; maintenance of general and special purpose vehicles; aircraft corrosion control; and nondestructive inspection activities (Jacobs Engineering, 1995a,b).

“Waste oils” generally refers to lubricating fluids, such as crankcase oils and synthetic turbine oils. Hydraulic fluids have also been included in this category. “Recoverable fuels” refers to fuel drained from aircraft tanks and vehicles, such as jet propulsion fuel grade 4 and motor gasoline. “Spent solvents and cleaners” refers to liquid used for degreasing and general cleaning of aircraft, aircraft systems, electronic components, and vehicles. This category includes PD-680 and various chlorinated organic compounds, such as carbon tetrachloride, TCE, and 1,1,1-trichloroethane (TCA).

Specific types of solvents used by the Air Force have changed over the years. In the 1950s, carbon tetrachloride was in common use. Its use was replaced by TCE about 1960. Since then, TCE and 1,1,1-TCA have been commonly used; however, TCE usage has decreased in favor of 1,1,1-TCA. Today, PD-680 Type II, 1,1,1-TCA, and TCE are used.

Waste paint solvents or thinners and strippers are generated by corrosion control activities. Typical thinners include isobutyl acetate, toluene, methyl ethyl ketone, isopropanol, naphtha, and xylene. Paint strippers generally contain such compounds as methylene chloride, toluene, ammonium hydroxide, and phenolics (CH2M Hill, 1996).

All of these operations generated waste materials, primarily oils, recoverable fuels, spent solvents, and cleaners. Most waste oils, recovered fuels, spent solvents and cleaners were either burned at fire training areas on the NAS Fort Worth, reused on NAS Fort Worth, or processed through the Defense Property Disposal Office. An undetermined amount of these materials were discharged through the OWSs to the Sanitary Sewer System at the NAS Fort Worth (Jacobs Engineering, 1995a,b).

2.3.3 Results of Previous Site Investigations

In 1984, the Installation Restoration Program (IRP) was initiated at NAS Fort Worth and began with a program records search conducted by CH2M Hill, Inc. Since 1984, Air Force IRP studies have been conducted by several contractors, and have focused on the identification and characterization of waste disposal areas and SWMUs identified in the installation's RCRA Part B permit.

Several OWSs were designated as SWMUs in an RFI report by U.S. Environmental Protection Agency (EPA) (A.T. Kearney, 1989). Eight OWSs were designated as SWMUs and four were designated as areas of concern (AOC).

An investigation of 11 OWSs at NAS Fort Worth was performed by Law Environmental, Inc. (Law) to assess contamination and evaluate the condition and future use of the OWSs. The Law report indicated that two of the separators, located at Building 1015 (SWMU No. 47) and Building 1194 (SWMU No. 35), were connected to the Sanitary Sewer system. The discharge connections of the remaining OWSs investigated were not reported, but are assumed connected to the Sanitary Sewer System (Law, 1995).

Shallow and deep soil samples were collected by Law at the 11 units and analyzed for volatile organic compounds (VOC) by EPA Method SW8240 and RCRA metals (except mercury) by EPA Method SW6010. No analyses for semivolatile organic compounds (SVOC) were performed, but organic odors were detected during sampling activities. No groundwater samples were collected for the Law investigation. None of the soil samples analyzed contained volatile organics above TNRCC RRSs. Soils in the immediate area of each of the 11 OWSs, however, were contaminated with metals concentrations exceeding TNRCC RRSs (Law, 1995).

IT conducted an RFI on the Sanitary Sewer System (SWMU No. 66) in 1997. For the RFI, soil, groundwater, and geotechnical data were collected. Results of this investigation were published by IT in the draft Sanitary Sewer System RFI report in August 1997 (IT, 1997a). The Sanitary Sewer System RFI report indicated no unacceptable risk to human health or the environment from past management practices of the Sanitary Sewer System. The draft RFI reported the extent of some releases was not known.

During the Sanitary Sewer System RFI, IT collected additional soil, groundwater, and geotechnical data where OWS data gaps had been identified. These samples were collected at the OWSs to assess the nature of contamination at the OWSs and to determine potential impacts of past releases of industrial sewer discharges from the OWSs into the Sanitary Sewer System.

At the eight OWSs previously investigated by Law that were connected to the Sanitary Sewer System, IT collected soil samples and performed supplemental SVOCs and pesticides/

polychlorinated biphenyls analysis, installed monitoring wells, and sampled groundwater for VOCs, SVOCs, and metals. At OWSs that were not previously investigated by Law, IT collected near surface and subsurface soils that were analyzed for VOCs, SVOCs, pesticides/polychlorinated biphenyls, and metals, and monitoring wells were installed for sampling groundwater for VOCs, SVOCs, and metals. Results of this investigation were published by IT in the draft Sanitary Sewer System RFI report in August 1997. The draft Sanitary Sewer System RFI report identified the Building 1145 and Building 3358 OWSs for additional investigation to determine the vertical and horizontal extent of contaminants in soil and groundwater at the two OWSs (IT, 1998b).

The OWS RFI addendum report (IT, 1998a) presented the combined investigation findings from the draft Sanitary Sewer System RFI report and additional investigation of 21 OWSs. As shown by Table 1-1 of that addendum report, 8 OWSs have been identified as SWMUs and four have been identified as AOC. Nine of the OWSs have not been designated as either a SWMU or AOC.

Additional investigation was conducted at the Building 1145 OWS (AOC No. 13), where light nonaqueous-phase liquid (LNAPL) was discovered on the groundwater during the 1997 RFI, and at Building 3358. Additional investigation was performed at the Building 3358 OWS to determine the horizontal extent of near-surface soil contamination, and the findings show the metals and organic contamination in surface soils is limited to one sample location. Investigation findings from the Building 1145 OWS show the LNAPL found on the water table in monitoring well WITCTA036 is limited in lateral extent to the vicinity of this location. Dissolved-phase groundwater contamination associated with the monitoring well WITCTA036 LNAPL is also restricted to a limited area surrounding this location. Surface and subsurface soil contamination is also limited in extent due to the removal of the leaking OWS in 1995; the excavated area was backfilled with clean fill.

In the OWS RFI addendum report (IT, 1998a), evaluation of the closure status of each of the 21 OWS units was made to TNRCC RRSs. All OWSs were recommended for either Standard I or Standard II closure. The TNRCC RRSs defined in 30 TAC 335 Subchapter S specify a consistent risk management policy to define the cleanup actions necessary to protect human health and the environment. The RRSs define the following three tiers of cleanup standards:

- RRS 1 requires a cleanup to nondetectable levels or background levels unaffected by waste management activities for all contaminants. This level of a cleanup is commonly referred to as "clean closure." Deed certification on the property and post-closure care is not required under this standard.
- RRS 2 requires a cleanup to health-based levels such that any substantial threat to human health or the environment is reduced to acceptable levels. Deed certification on the property is required.
- RRS 3 requires a site-specific baseline risk assessment to define alternative cleanup levels based on health effects. Deed certification and post-closure care are required under this standard.

The OWS RFI addendum report (IT, 1998a) presented the TNRCC RRSs status of each OWS at NAS Fort Worth. Where the contaminant concentrations did not exceed background UTL, the OWS was recommended for Standard I closure. One OWS of the twenty-one investigated, the Building 1628 OWS, met this requirement. Where contaminant concentrations exceeded background UTLs only and not media-specific concentrations (MSC), the OWS was recommended for RRS 2, which requires deed certification. Seven of the OWSs met this requirement. For an OWS that has contaminants exceeding both UTLs and MSCs in either soil and/or groundwater, the OWS was recommended for RRS 2 closure. The report indicated that for most of the OWSs, one or two of the soil sample locations had metals, specifically arsenic and cadmium, that were approximately twice the concentration of the MSCs. It was recommended that additional sampling be performed at these locations to determine if the detections of metals are statistically significant and to allow preparation of corrective measures.

Based on TNRCC review of the OWS RFI addendum report, discussions were held between the Air Force and TNRCC to define the process for evaluating the existing data and selecting sites requiring additional investigation. Additional investigation is required for the OWSs exceeding RRS 2 levels. Criteria developed for determining the selection of locations requiring additional assessment of selected environmental media are as follows:

- Locations requiring resampling to confirm constituent detections less than one order of magnitude above RRS 1 background concentration UTL criteria

- Locations requiring contaminant lateral delineation due to detections exceeding an order of magnitude above the background concentration UTL and the occurrence of the contaminant is consistent with past waste operations at the site
- Locations requiring analysis by the SPLP (EPA SW846 Method 1312) to determine if contaminants exceeding the RRS 2 criteria may leach from soil to groundwater.

3.0 Plan of Investigation

This chapter of the work plan defines the scope of work to be performed during the additional investigation at the OWSs listed in Table 1. Activities associated with the collection of analytical data for site characterization at each site are addressed in this chapter. These investigation activities include collection of soil samples (surface/near-surface and subsurface), groundwater, and surface water.

The location of NAS Fort Worth is shown in Figure 1. The locations of the OWSs throughout the industrialized areas of the facility are shown in Figure 2.

3.1 OWS Investigation Locations

Varying methods will be used for collection at different media and allow contaminant delineation in the near-surface soil, subsurface soil, and groundwater. The data presented in Table 2 summarizes the contaminants at specific locations that exceeded TNRCC RRSs. Data presented in Table 2 show OWS sample locations where contaminants exceeded either the background concentration, the TNRCC RRSs, or the human health protective limits developed in the Sanitary Sewer System RFI risk assessment. Information presented in Table 2 was used to identify the data gaps that need to be closed to allow completion of the OWS RFI assessment under the TNRCC RRSs.

Table 3 shows soil sample locations and Table 4 shows groundwater sample locations requiring additional OWS contaminant delineation, which include:

- Twelve near-surface soil sample locations
- Sixteen subsurface soil sample locations
- Four installed monitoring wells and groundwater samples
- Nine monitoring well groundwater confirmation samples.

Table 5 shows the number of analyses required to delineate lateral contamination including:

- Soils (45 specific metals, 17 SPLP for specific metals)
- Groundwater samples (4 VOCs, 21 metals)
- Three groundwater VOC analyses (3 existing monitoring wells)
- Eleven groundwater metals analyses (6 existing monitoring wells, 4 new monitoring wells).

These analyses do not include the number of field (10 percent field blanks and 1 daily equipment blank) and laboratory QA/QC samples (5 percent matrix spike/matrix spike duplicate).

3.2 OWS Phase 2 RFI Surface Soil Investigation

Soil samples will be collected to either delineate potential soil contamination or confirm low detections of contaminants. The near-surface soil samples will be discrete grab samples collected from 0 to 2 feet in depth. The near-surface soil samples will be collected at locations shown on Figures 3 through 23. The number of soil samples to be collected and parameters to be analyzed are shown in Table 3.

The sample tubes will be driven into the ground with a direct-push technology soil probe. All sampling equipment will be decontaminated before its use. Specific soil sample collections techniques are provided in the FSP (IT, 1997d).

Criteria for selection of near-surface soil sample locations are as follows:

- Locations requiring resampling to confirm constituent detections less than one order of magnitude above RRS 1 background concentration UTL criteria
- Locations requiring contaminant lateral delineation due to detections exceeding an order of magnitude above the background concentration UTL and the occurrence of the contaminant is consistent with past waste operations at the site
- Locations requiring analysis by the SPLP (EPA SW846 Method 1312) to determine if contaminants exceeding the RRS 2 criteria present a potential release of soil constituents by leaching from soil to groundwater.

Lab Methods. Near-surface soil samples will be submitted for analysis using EPA SW846 Method SW6010 RCRA metals, including mercury. Metals analysis will be performed to ensure

the method reporting limit is lower than the constituent background UTL concentration. Analytical parameters and the number of samples to be collected are shown in Tables 3 and 5.

3.3 OWS Phase 2 RFI Subsurface Soil Investigation

Subsurface soil samples will be collected at several locations at the OWSs requiring additional investigation. The subsurface soil sampling locations are shown on Figures 3 through 23. The sample location and proposed analytical parameters selected for each soil sample are shown on Table 3.

The subsurface soil samples will be collected with direct-push technology soil probe methods as described in the previous section.

Criteria for the subsurface soil sampling locations follow the same criteria as those used for soil samples, as described in the previous section.

One subsurface soil sample will be collected at each soil boring. The subsurface soil sample collected at each soil boring will be collected from 2 feet above the groundwater elevation to the top of the water table. Field screening procedures will be used where visible contamination is observed or headspace soil field screening indicates the presence of organic contaminants. The project manager will be called to determine if an additional subsurface soil sample is required if unanticipated organic contamination is detected. Field screening procedures will follow those outlined in the Sanitary Sewer RFI FSP (IT, 1997c).

Lab Methods. Subsurface soil samples will be submitted for analysis using EPA SW846 Method SW6010 RCRA metals, including mercury. Metals analysis will be performed to ensure the method reporting limit is lower than the constituent background UTL concentration. Analytical parameters and the number of samples to be collected are shown in Tables 3 and 5.

3.4 OWS Phase 2 RFI Groundwater Investigation

Groundwater will be investigated at ten OWS locations for this phase of work. Groundwater samples will be collected to either confirm previous detections of constituents less than one order of magnitude above background concentration UTLs and PQLs, or delineate contaminants exceeding RRS 2 MSCs. Fourteen locations will be sampled by low flow methods to confirm

the low concentration of constituents detected during the Sanitary Sewer System RFI (IT, 1998a). Eleven locations will be sampled to confirm low detections of specific inorganic constituents. One location will have three wells resampled to confirm chlorinated VOCs detected in wells installed during the first phase of the OWS RFI investigation. One location (monitoring well WITCTA031) will have the original monitoring well resampled to confirm the original detection of 51 micrograms per liter arsenic, which exceeded the maximum contaminant level (MCL). Four monitoring wells will be installed surrounding the monitoring well WITCTA031 to determine the extent of the dissolved arsenic plume.

Objectives of the groundwater sampling are as follows:

- Confirm the presence of groundwater constituents exceeding TNRCC RRS 1 background concentration UTL.
- Confirm the presence of groundwater constituents exceeding TNRCC RRS 2 MSCs and EPA MCLs.
- Define the lateral extent of the dissolved metal plumes.
- Characterize groundwater conditions at the sites.

Investigation Procedures. Proposed groundwater monitoring well locations for the Building 1191 SWMU will be determined in the field. Two wells will be installed west of Building 1191, which is upgradient of the two OWS. Two wells will be placed south of Building 1191 along the southern boundary fence to determine the extent of the arsenic detections. The monitoring wells will be installed to determine the lateral extent of the dissolved metals groundwater plume. The objective of the program will guide subsequent monitoring well placement if the original monitoring wells do not define the lateral extent of the groundwater plumes.

One monitoring well will be located upgradient of the OWS in an area determined by examination of the groundwater gradient. One monitoring well will be placed downgradient of the OWS but outside of the plume. Two monitoring wells will be installed laterally from the monitoring well WITCTA031 to define the extent of the dissolved metals plume. Monitoring wells will be built according to construction procedures outlined in the project SAP. Low flow sampling methods and the field measurement of groundwater parameters outlined in the Sanitary

Sewer System FSP will be used to collect groundwater samples from the permanent monitoring wells (IT, 1997c).

Laboratory Methods. Groundwater confirmation samples from permanent monitoring wells will be collected and submitted for analysis using EPA SW846 Methods SW8260 VOA and SW6010 RCRA metals, including mercury. Analytical parameters for both temporary and permanent monitoring well groundwater samples are shown in Table 4. The total number of samples collected, including QC samples, are shown in Table 4. The total number of samples to be collected and the analytical program are shown on Table 5.

Groundwater field parameters will be measured during collection of samples from both temporary monitoring wells and permanent monitoring wells that have been installed. Parameters to be measured in the field include pH, temperature, conductivity, dissolved oxygen, turbidity, and redox potential. Field analysis parameters are shown on Table 6.

3.5 Investigation-Derived Waste Management

Wastes that may be generated during the RFI site investigation include: (1) purged groundwater, (2) decontamination water, (3) drill cuttings, (4) expendable protective clothing (e.g., Tyvek), and (5) general trash. Modifications to the planned waste management may be made if waste attributes change or field observations warrant a change. The general waste management approach is presented in this subsection; the detailed approach is included in the FSP (IT, 1997d).

All groundwater generated during monitoring well development and purging and decontamination water generated during decontamination process will be contained on-site (base) at the central storage location. All water will be stored in labeled, 55-gallon, U.S. Department of Transportation drums. The water will be tested for VOCs, diesel range organics, gasoline range organics, and metals and the analytical results reviewed to determine if the water requires treatment before disposal. If treatment is required, the water will be treated and tested prior to discharge to the sanitary sewer. The analytical results will be provided to NAS Fort Worth environmental authorities for review and approval before discharge to the NAS Fort Worth Sanitary Sewer System.

Naval Air Station Fort Worth
Phase 2 RFI OWS Work Plan
Revision: 0
October 1999
Page 16 of 21

Drill cuttings from soil probe and drilling activities will be contained in drums, which will be labeled and kept at the NAS Fort Worth designated storage location until analytical data are received. Contaminated soils will be disposed of at an appropriate licensed landfill, most likely as industrial, nonhazardous waste.

Waste disposal activity will be coordinated with NAS Fort Worth environmental authorities. Any hazardous waste disposal will be at a site selected by NAS Fort Worth environmental authorities, who will sign any transportation manifest as the "generator." All waste management practices will follow the guidelines established by the TNRCC.

4.0 Reporting

After the available data have been evaluated, including field characterization data from the OWS RFI, a report will be prepared that compiles and evaluates the information. The primary objective of the OWS Phase 2 RFI addendum report will be to compile all existing data, evaluate the data by current TNRCC regulations, and present conclusions as to the need for remedial or other actions.

A preliminary outline of the report is shown in Figure 24. The outline follows the guidelines specified by TNRCC for a comprehensive site assessment report under the Risk Reduction Program.

5.0 Schedule

The project schedule is shown on Figure 25.

6.0 Project Management

The objectives of this OWS Phase 2 RFI investigation are to:

- Complete OWS Phase 2 RFI addendum report tasks in accordance with this work plan, the Sanitary Sewer System RFI health and safety plan, and the Sanitary Sewer System RFI QAPP as scheduled and within the allotted budget.
- Communicate with project participants (Air Force Base Conversion Agency, AFCEE, TNRCC, EPA) the technical compliance, scheduled and actual program progress, and budgetary status of the project as appropriate.
- Complete and issue an OWS Phase 2 RFI addendum report.
- Submit to regulatory agencies recommendations for suggested remedial actions at OWS.

This task includes coordinating among other RFI project participants, as well as tracking schedules and budgets and preparing monthly status reports to AFCEE. Preparation of project information, forecasting, and updating of schedules and budgets will also be done under this task.

A more detailed description of project organization and responsibility is provided in Section 3.0 of the QAPP (IT, 1997c). The project organization is shown on Figure 26.

7.0 References

CH2M Hill, 1996, *HQ Air Force Center for Environmental Excellence, Interim Draft, Naval Air Station Fort Worth Joint Reserve Base, Base-Wide Quality Assurance Project Plan*, August 1996.

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Naval Air Station Fort Worth
Phase 2 RFI OWS Work Plan
Revision: 0
October 1999
Page 21 of 21

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TABLES

Table 1

**Oil/Water Separator RFI Locations
OWS Phase 2 RFI Work Plan
NAS Fort Worth, Texas
Project No. 768579**

Building Number	AOC/ SWMU No.	Previous Soil Investigation	Type	Capacity (gallons)	Year of Installation	Outlet
1015	SWMU 47	LAW and IT	A	N/D	1967	Sanitary Sewer
1027	SWMU 44	LAW and IT	A	N/D	N/D	Sanitary Sewer
1060	AOC 11	LAW and IT	A	750	1985	Sanitary Sewer
1064	AOC 10	LAW and IT	A	18,000	1988	Sanitary Sewer
1101	N/D	IT	B	4,000	N/D	Sanitary Sewer
1145	AOC 13	LAW and IT	A	1,500	1982	Sanitary Sewer
1190	SWMU 52	LAW and IT	A	2,000	NA	Sanitary Sewer
1191	SWMU 37	LAW and IT	A	N/D	1982	Sanitary Sewer
1194	SWMU 35	LAW and IT	A	N/D	N/D	Sanitary Sewer
1194	N/D	IT	B	N/D	N/D	Sanitary Sewer
1320	N/D	IT	B	400	N/D	Sanitary Sewer
1414	SWMU 41	LAW and IT	A	1,000	N/D	Sanitary Sewer
1423	N/D	IT	A	2,700	N/D	Sanitary Sewer
1602	N/D	IT	B	18,524	N/D	Sanitary Sewer
1628	SWMU 7	IT	A	5,113	1980	Sanitary Sewer
1643	SWMU 40	IT	A	20,000	1982	Sanitary Sewer
1655	N/D	IT	A	N/D	N/D	Sanitary Sewer
1656	N/D	IT	A	18,524	1989	Sanitary Sewer
3358	N/D	IT	B	N/D	N/D	Sanitary Sewer
4146	N/D	IT	A	N/D	1983	Sanitary Sewer
4160	N/D	IT	B	N/D	1984	Sanitary Sewer
4210	AOC 12	IT	A	N/D	N/D	Sanitary Sewer

Notes:

A - Oil/water separator
B - Grit/oil interceptor
N/D - Not determined

Table 2

Oil/Water Separator Phase 2 RFI Status Table
With Recommended TNRCC Risk Reduction Program Action
OWS Phase 2 RFI Work Plan
NAS Fort Worth, Texas
Project No. 768579

(Page 1 of 8)

OWS Bldg.	SWMU/ AOC	Sample Locations	Media Affected	Constituent	Max Result	Units	TNRCC RRS ⁴	Recommendations
1015	SWMU 47	101501 101502	SURFACE SOIL	ARSENIC	10	mg/kg	II pass SPLP	Run SPLP Method 1312 test for surface and subsurface soils
				CADMIUM	2.3	mg/kg		
				CALCIUM	280000	mg/kg		
1027	SWMU 44	101501 101502 101503	SUBSURFACE SOIL	ARSENIC	11	mg/kg	II pass SPLP	Prepare CMS Study if necessary Submit Standard II Closure w/Deed Restriction
				CADMIUM	1.2	mg/kg		
				COPPER	25	mg/kg		
		102701 102702 102703 102704	SURFACE SOIL	ARSENIC	10	mg/kg	II pass SPLP	Run SPLP Method 1312 test for surface and subsurface soils
				CADMIUM	6.1	mg/kg		
				COPPER	28	mg/kg		
				LEAD	58	mg/kg		
				ZINC	690	mg/kg		
				ARSENIC	14	mg/kg		Prepare CMS Study if necessary Submit Standard II Closure w/Deed Restriction
				CADMIUM	1.5	mg/kg		
				COPPER	30	mg/kg		
				MANGANESE	600	mg/kg		
				MAGNESIUM	2900	mg/kg		
1060	AOC 11	WITCTA037	Groundwater	BERYLLIUM	0.36	µg/L	II	Run SPLP Method 1312 test for surface and subsurface soils
		WITCTA022	Groundwater	BERYLLIUM	0.37	µg/L		
				IRON	444	µg/L		
		106003	SURFACE SOIL	ARSENIC	9.8	mg/kg		
				CADMIUM	0.74	mg/kg		
				CALCIUM	290000	mg/kg	II pass SPLP	Prepare CMS Study if necessary Submit Standard II Closure w/Deed Restriction
				COPPER	30	mg/kg		
				MAGNESIUM	6400	mg/kg		

Table 2

Oil/Water Separator Phase 2 RFI Status Table
With Recommended TNRCC Risk Reduction Program Action
OWS Phase 2 RFI Work Plan
NAS Fort Worth, Texas
Project No. 768579

(Page 2 of 8)

OWS Bldg.	SVMU/ AOC	Sample Locations	Media Affected	Constituent	Max Result	Units	TNRCC RRS ⁴	Recommendations
1060 (Continued)	AOC 11	106001	SUBSURFACE	ARSENIC	12	mg/kg	II pass SPLP	
		106003	SOIL	CADMIUM	2.2	mg/kg		
		106004		COPPER	30	mg/kg		
				IRON	16000	mg/kg		
				MAGNESIUM	3400	mg/kg		
1084	AOC 10	WITCTA035	Groundwater	IRON	1070	µg/L	II	Run SPLP Method 1312 test for surface and subsurface soils
				MANGANESE	985	µg/L		
		106402SBA	SURFACE SOIL	CADMIUM	1.6	mg/kg	II pass SPLP	Prepare CMS Study if necessary Submit Standard II Closure w/Deed Restriction
				ARSENIC	16	mg/kg		
		106401	SUBSURFACE SOIL	CADMIUM	4.0	mg/kg	II pass SPLP	
				COPPER	87	mg/kg		
				MAGNESIUM	5600	mg/kg		
				MANGANESE	470	mg/kg		
				ZINC	44	mg/kg		
				BERYLLIUM	1.1	mg/kg		
1101	ND	SB110101	SURFACE SOIL	CADMIUM	0.89	mg/kg	II pass SPLP	Run SPLP Method 1312 test for surface and subsurface soils
				IRON	18400	mg/kg		
		SB110101	SUBSURFACE SOIL	ARSENIC	11.3	mg/kg	II pass SPLP	Prepare CMS Study if necessary Submit Standard II Closure w/Deed Restriction
				CADMIUM	0.7	mg/kg		
				IRON	15600	mg/kg		
				VANADIUM	49.5	mg/kg		
				BERYLLIUM	0.51	µg/L		
				MANGANESE	315	µg/L		
		WITCTA019	Groundwater	BERYLLIUM	0.51	µg/L		
				MANGANESE	315	µg/L		

Table 2
Oil/Water Separator Phase 2 RFI Status Table
With Recommended TNRCC Risk Reduction Program Action
OWS Phase 2 RFI Work Plan
NAS Fort Worth, Texas
Project No. 768579

(Page 3 of 8)

OWS Bldg	SWMU/ AOC	Sample Locations	Media Affected	Constituent	Max Result	Units	TNRCC RRS ⁴	Recommendations
1145	AOC 13	WTCTA036	Groundwater	LNAPL			II	Continue LNAPL Removal
		WTCTA041	Groundwater	1,1-DICHLOROETHANE	9.5	µg/L		Continue Groundwater Monitoring
				1,2,4-TRIMETHYLBENZENE	3.7	µg/L		Test for Metals Leaching
				1,2-DICHLOROBENZENE	0.39	µg/L		w/SPLP Method 1312 test
				1,3,5-TRIMETHYLBENZENE	1.8	µg/L		for surface and subsurface soils
				BENZENE	3.3	µg/L		Prepare CMS Study
				ETHYLBENZENE	3.4	µg/L		Submit Standard II Closure
				O-XYLENE	3.9	µg/L		w/Deed Restriction
				TOLUENE	3.7	µg/L		
				NAPHTHALENE	3.3	µg/L		
				VINYL CHLORIDE	2.1	µg/L		
		114503	SURFACE	ARSENIC	17	mg/kg	II pass SPLP	
		114504	SOIL	CALCIUM	310000	mg/kg		
		SB114507		CADMIUM	2.3	mg/kg		
				ANTIMONY	0.69	mg/kg		
				LEAD	159	mg/kg		
				TOLUENE	0.0073	mg/kg		
		114501	SUBSURFACE	ARSENIC	9.4	mg/kg	II pass SPLP	
		114502	SOIL	ANTIMONY	0.64	mg/kg		
		114503		CADMIUM	3.2	mg/kg		
		114504		N-BUTYLBENZENE	0.022	mg/kg		
				N-PROPYLBENZENE	0.0059	mg/kg		
				NAPHTHALENE	0.18	mg/kg		

Table 2

Oil/Water Separator Phase 2 RFI Status Table
With Recommended TNRCC Risk Reduction Program Action
OWS Phase 2 RFI Work Plan
NAS Fort Worth, Texas
Project No. 768579

(Page 4 of 8)

OWS Bldg.	SWMU/ AOC	Sample Locations	Media Affected	Constituent	Max Result	Units	TNRCC RRS ⁴	Recommendations
1190	SWMU 52	WITCTA032	Groundwater	ARSENIC IRON MANGANESE	35.8 4880 863	µg/L µg/L µg/L	II	Run SPLP Method 1312 test for surface soils Prepare CMS Study if necessary Submit Standard II Closure w/Deed Restriction
		11901 11902 11903	SURFACE SOIL	ARSENIC CADMIUM	7.6 3.6	mg/kg mg/kg	II pass SPLP	
1191	SWMU 35	WITCTA031	Groundwater	ARSENIC BARIUM IRON MANGANESE	51.7 1480 5350 1720	µg/L µg/L µg/L µg/L	II	Additional Contaminant Delineation Sample west wall OWS surface soils for VOCs & metals SPLP Method 1312 test for surface and subsurface soils Resample WITCTA031
		119103 119104	SURFACE SOIL	SILVER CALCIUM	2 404000	mg/kg mg/kg	II pass SPLP	Prepare CMS Study if necessary Submit Standard II Closure w/Deed Restriction
		119101 119102 119103 119104	SUBSURFACE SOIL	ARSENIC CALCIUM CADMIUM COPPER	14 370000 2.7 16	mg/kg mg/kg mg/kg mg/kg	II pass SPLP	
1194	SWMU 35	BGSMW01	Groundwater	IRON MANGANESE MERCURY	2310 528 0.11	µg/L µg/L µg/L	II	Additional Contaminant Delineation SPLP Method 1312 test for surface and subsurface soils
Investigated by HGL		WITCTA027	Groundwater	IRON SILVER	2870 4.6	µg/L µg/L		Prepare CMS Study if necessary Submit Standard II Closure w/Deed Restriction

Table 2

Oil/Water Separator Phase 2 RFI Status Table
With Recommended TNRCC Risk Reduction Program Action
OWS Phase 2 RFI Work Plan
NAS Fort Worth, Texas
Project No. 768579

(Page 5 of 8)

OWS Bldg.	SWMU/ AOC	Sample Locations	Media Affected	Constituent	Max Result	Units	TNRCC RRS ⁴	Recommendations
1194 (Continued)	SWMU 35	119402	SURFACE	CADMIUM	2.4	mg/kg	II pass SPLP	
			SOIL	COPPER	24	mg/kg		
		119401	SUBSURFACE	ARSENIC	5.7	mg/kg	II pass SPLP	
		119402	SOIL	CADMIUM	2.7	mg/kg		
		119403		MANGANESE	370	mg/kg		
1320	ND	SB132002	SUBSURFACE	SILVER	3.8	mg/kg	II	No Further Action Submit Standard II Closure w/Deed Restriction
1414	SWMU 41	WITCTA016	Groundwater	IRON	249	µg/L	II	Run SPLP Method 1312 test for surface and subsurface soils
		DP1703	SURFACE SOIL	ARSENIC	8.7	mg/kg	II pass SPLP	Prepare CMS Study if needed Submit Standard II Closure w/Deed Restriction
				CADMIUM	2.2	mg/kg		
				COBALT	16	mg/kg		
				IRON	16000	mg/kg		
				LEAD	51	mg/kg		
				MANGANESE	430	mg/kg		
		DP1701	SUBSURFACE	ARSENIC	11	mg/kg	II pass SPLP	
		DP1702	SOIL	BARIUM	150	mg/kg		
		DP1703		CADMIUM	1.6	mg/kg		
				COBALT	7.7	mg/kg		
				COPPER	18	mg/kg		
				LEAD	51	mg/kg		
				MAGNESIUM	3100	mg/kg		
				MANGANESE	500	mg/kg		

Table 2
Oil/Water Separator Phase 2 RFI Status Table
With Recommended TNRCC Risk Reduction Program Action
OWS Phase 2 RFI Work Plan
NAS Fort Worth, Texas
Project No. 768579

(Page 6 of 8)

OWS Bldg.	SWMU/ AOC	Sample Locations	Media Affected	Constituent	Max Result	Units	TNRCC RRS ⁴	Recommendations
1423	ND	WITCTA014	Groundwater	IRON	2720	µg/L	II	No Further Action Submit Standard II Closure w/Deed Restriction
		SB142301	SURFACE	SILVER	0.53	mg/kg	II	
		SB142302	SOIL					
1602	ND	SB142302	SUBSURFACE	SILVER	0.39	mg/kg	II	Run SPLP Method 1312 test for surface and subsurface soils Submit Standard II Closure w/Deed Restriction
			SOIL					
		WITCTA011	Groundwater	ARSENIC	24.4	µg/L	II	
				IRON	799	µg/L		
				MANGANESE	630	µg/L		
		SB160201	SURFACE	CHROMIUM	46.5	mg/kg	II pass SPLP	
		SB160202	SOIL	LEAD	10	mg/kg		
				MOLYBDENUM	1.6	mg/kg		
				SILVER	0.42	mg/kg		
		SB160201	SUBSURFACE	ARSENIC	9.1	mg/kg	II pass SPLP	
1628 Investigated by HGL	SWMU 7	SB160202	SOIL	BERYLLIUM	0.67	mg/kg		Run SPLP Method 1312 test for subsurface soils Submit Standard II Closure w/Deed Restriction
				COBALT	8.5	mg/kg		
				IRON	18300	mg/kg		
				SILVER	0.51	mg/kg		
		MS1418	SURFACE	SILVER	8.06	0.76		
		MS1422	SUBSURFACE	MANGANESE	2.38	377	II pass SPLP	
				SILVER	8.33	0.47		
		MS1368	SURFACE	LEAD	56.05	9.2	II	

Table 2

Oil/Water Separator Phase 2 RFI Status Table
With Recommended TNRCC Risk Reduction Program Action
OWS Phase 2 RFI Work Plan
NAS Fort Worth, Texas
Project No. 768579

(Page 7 of 8)

OWS Bldg.	SWMU/ AOC	Sample Locations	Media Affected	Constituent	Max Result	Units	TNRCC RRS ⁴	Recommendations
1643 Investigated by HGL	SWMU 40	WITCTA006	Groundwater	ARSENIC	28.2	µg/L		Run SPLP Method 1312 test for surface soils
				IRON	1740	µg/L		
				MANGANESE	1660	µg/L		
		SB164301 SB164302	SURFACE SOIL	CADMIUM	1	mg/kg	II pass SPLP	Prepare CMS Study Submit Standard II Closure w/Deed Restriction
				LEAD	81.8	mg/kg		
		SB164301	SUBSURFACE SOIL	IRON	17000	mg/kg	II	
1655	ND	WITCTA004	Groundwater	IRON	1470	µg/L	II	No Further Action Submit Standard II Closure w/Deed Restriction
				MANGANESE	977	µg/L		
				SODIUM	177000	µg/L		
1656	ND	SB165502	SUBSURFACE SOIL	BARIUM	136	mg/kg	II	No Further Action Submit Standard II Closure w/Deed Restriction
				MANGANESE	2210	mg/kg		
		SB165601	SURFACE SOIL	CALCIUM	302000	mg/kg	II	
				MAGNESIUM	3320	mg/kg		
3358	ND	SB335801	SURFACE SOIL	SILVER	1.8	mg/kg		Run SPLP Method 1312 test for surface soils Prepare CMS Study if needed Submit Standard II Closure w/Deed Restriction
				ARSENIC	7.8	mg/kg	II pass SPLP	
				LEAD	91.6	mg/kg		
				ZINC	91.5	mg/kg		
4146	ND	SB414601 SB414602 SB414603	SURFACE SOIL	CALCIUM	234000	mg/kg	II pass SPLP	Run SPLP Method 1312 test for surface soils Submit Standard II Closure w/Deed Restriction
				LEAD	42	mg/kg		
				MOLYBDENUM	1.6	mg/kg		
				SILVER	0.62	mg/kg		

Table 2

Oil/Water Separator Phase 2 RFI Status Table
With Recommended TNRCC Risk Reduction Program Action
OWS Phase 2 RFI Work Plan
NAS Fort Worth, Texas
Project No. 768579

(Page 8 of 8)

OWS Bldg.	SWMU/ AOC	Sample Locations	Media Affected	Constituent	Max Result	Units	TNRCC RRS ⁴	Recommendations
4146 (Continued)		SB4604	SUBSURFACE SOIL	CALCIUM	325000	mg/kg	II	
				MAGNESIUM	2730	mg/kg		
				MANGANESE	859	mg/kg		
				SILVER	0.42	mg/kg		
4160	ND	SB416001	SURFACE SOIL	SILVER	0.53	mg/kg	II	No Further Action Submit Standard II Closure w/Deed Restriction
4210	AOC 12	WITCTA020	Groundwater	BERYLLIUM	0.51	µg/L	II	Additional Contaminant Delineation Sample surface soils for VOCs & metals Run SPLP Method 1312 test for subsurface soils Submit Standard II Closure w/Deed Restriction
				IRON	306	µg/L		
				ARSENIC	19	mg/kg		
				CADMIUM	1.8	mg/kg		
				COBALT	12	mg/kg		
				COPPER	52	mg/kg		
				IRON	17000	mg/kg		
				LEAD	36	mg/kg		
				MANGANESE	660	mg/kg		
				NICKEL	16	mg/kg		
				VANADIUM	38	mg/kg		
				ZINC	32	mg/kg		

Notes:

1 - UTLs derived from Draft Basewide Background Study, Jacobs Engineering, January 1997. No background concentration available for organic compounds.

3 - TNRCC Risk Reduction Standard Media-Specific Concentration (MSC) - Industrial Setting.

4 - Proposed TNRCC Risk Reduction Program Standard.

II pass SPLP - Standard II closure can be achieved if soils pass SPLP Method 1312 test.

Boxed cell represents constituent concentration greater than both the UTL and the MSC.

Organic compounds exceed the method PQL.

Table 3

Analytical Soil Boring Samples
OWS Phase 2 RFI Work Plan
NAS Fort Worth, Texas
Project No. 768579

Analysis		No. of field samples to be taken at each location excluding QC samples. Please see Note 1		Rationale: Confirm/ Delineate	VOA by SW8260	SVOA by SW8270	TAL Metals by SW8010/7000	Pest/PCB by SW8080	SPLP VOA by SW1312/SW 8260	SPLP SVOA by SW1312/SW8 270	SPLP Metals by SW1312/SW8010B (Trace)
Location	Map Location	Surface	Subsurface								
SB101503	BLDG1015	1	1	Delineate Law SB 101502	None, 4°C	None, < 4°C	None, 4°C	None, 4°C	None, 4°C	None, 4°C	
SB101504	BLDG1015	1	1	Confirm Law SB 101501			X				X
SB102703	BLDG1027	1	1	Delineate Law SB 102701			X				X
SB102702	BLDG1027	0	1	Confirm Law SB 102702			X				
SB106003	BLDG1060	1	1	Delineate Law SB 106003			X				X
SB106004	BLDG1060	0	1	Delineate Law SB 106001			X				
SB106403	BLDG1064	1	1	Delineate Law SB 106402			X				X
SB106404	BLDG1064	0	1	Delineate Law SB 106401			X				
SB110103	BLDG1101	1	1	Confirm IT SB110101			X				X
SB114510	BLDG1145	1	1	Delineate IT SB114507			X				X
SB119003	BLDG1191	1	0	Delineate IT SB119103							
SB119105	BLDG1191	0	1	Delineate Law SB 119101&-03			X				X
SB141403	BLDG1414	0	1	Delineate Law SB 141401			X				
SB141404	BLDG1414	1	1	Delineate Law SB 141403			X				X
SB160203	BLDG1602	1	1	Confirm IT SB160201			X				X
SB335808	BLDG3358	1	0	Confirm IT SB335801			X				
SB414601	BLDG4146	1	0	Confirm IT SB 414602			X				X
SB421003	BLDG4210	0	1	Confirm Law 421001			X				X
SB421004	BLDG4210	0	1	Delineate Law 421001			X				
Totals		12	16								

Note 1 - QC samples to be taken: MS/MSD - 5% of total field samples, 1 set per SDG or 1 set per 20 samples. Dup. - 10% of total field samples. Mat. Bk. - 1 per water source/matrix.
 Total blk - 1 per VOA cooler. Equip. Rinse - 1 per day.

Table 4

Analytical Groundwater Samples
OWS Phase 2 RFI Work Plan
NAS Fort Worth, Texas
Project No. 768579

Sample Location	Map Location	Analysis				VOA by SW8260	SVOA by SW8270	TAL Metals by SW6010/7000 (Dissolved)	Rationale/DQO	Field Parameters (See Table 3-6)
		No. of field samples to be taken at each location excluding QC samples. Please see Note 1	No. of field screening rapid TAT VOC samples to be collected at each location excluding QC samples.	HCL ₁ < 4°C 3 * 40 ml glass vials	None, < 4°C 1 Liter glass	HNO ₃ < 4°C 500 ml glass				
WTCTA037	BLDG1027	1						X - Be	Confirm/Resample - Be only	X
WTCTA022	BLDG1060	1						X - Be	Confirm/Resample - Be only	X
WTCTA019	BLDG1101	1						X - Be	Confirm/Resample - Be only	X
WTCTA040	BLDG1145	1		X					Confirm/Resample - VOC Only	X
WTCTA041	BLDG1145	1		X					Confirm/Resample - VOC Only	X
WTCTA043	BLDG1145	1		X					Confirm/Resample - VOC Only	X
WTCTA031	BLDG1191	1						X - As, Ba, Mn	Confirm/Resample - As, Ba, Mn	X
WTCTA1191_1	BLDG1191	1						X - As, Ba, Mn	Delineate - As, Ba, Mn Only	X
WTCTA1191_2	BLDG1191	1						X - As, Ba, Mn	Delineate - As, Ba, Mn Only	X
WTCTA1191_3	BLDG1191	1						X - As, Ba, Mn	Delineate - As, Ba, Mn Only	X
WTCTA1191_4	BLDG1191	1						X - As, Ba, Mn	Delineate - As, Ba, Mn Only	X
WTCTA011	BLDG1802	1						X - As	Confirm/Resample - As only	X
WTCTA020	BLDG4210	1						X - Be	Confirm/Resample - Be only	X
Total		9	4							

Note 1 - QC samples to be taken: MS/MSD - 5% of total field samples, 1 set per SDG or 1 set per 20 samples. Dup. - 10% of total field samples. Mat. Blk - 1 per water source/matrix.
Total blk - 1 per VOA cooler. Equip. Rinse - 1 per day.

Table 5

Summary Table of all Soil Boring and Groundwater Samples
 OWS Phase 2 RFI Work Plan
 NAS Fort Worth, Texas
 Project No. 768579

Parameter	Analytical Method	Matrix	Number of Field samples	Field Duplicate 10%	Matrix Spike 5%	Matrix Spike Duplicate 5%	Material Blank 1 per source/matrix	Equip. Rinsate 1 per Day	Trip Blank 1 per VOA cooler	Total No. of Samples	Combined Total No. of Water/Soil Samples
Volatiles	SW8260										
		Soil	0	0	0	0	0	0	0	0	
		Water	3	1	1	1	0	1	1	6	
		Combined									6
Semi-volatiles	SW8270										
		Soil	0	0	0	0	0	0	0	0	
		Water	0	0	0	0	0	0	0	0	
		Combined									0
TAL Metals	SW6010b Trace/ 7000										
		Soil	45	5	2	2	0	5	0	55	
		Water	20	2	1	1	1	2	0	24	
		Combined									79
SPLP	EPA Method 1312 SW60101b Trace 77300										
		Soil	14	1	1	1	0	0	0	15	
		Water	0	0	0	0	0	0	0	0	
		Combined									15
Field Parameters	See Table 6										
		Soil	0	0	0	0	0	0	0	0	
		Water	13	0	0	0	0	0	0	13	
		Combined									13

Table 6

Groundwater Field Sampling Test and Method Table
OWS Phase 2 RFI Work Plan
NAS Fort Worth, Texas
Project No. 768579

Field Analysis	Method
Dissolved Oxygen	E360.1
Redox Potential	Martin Marietta Energy Systems, Inc. Environmental Surveillance Procedures, ESP-307-5
pH	SW9040
Total Volatiles	PID Organic Vapor Monitor
Conductivity	SW9050
Temperature	E170.1
Turbidity	E180.1

FIGURES

11:27:36	STARTING DATE: 3/20/96	DATE LAST REV:	DRAFT, CHK. BY: C. TUMLIN	INITIATOR: W. CARTER	DWG. NO.: \768579ES.146
10 AUG 1999	DRAWN BY: K. BLAIR	DRAWN BY:	ENGR. CHK. BY: W. CARTER	PROJ. MGR.: W. CARTER	PROJ. NO.: 765725

PCOLEMAN
C:\CADD\DESIGN\768579ES.146

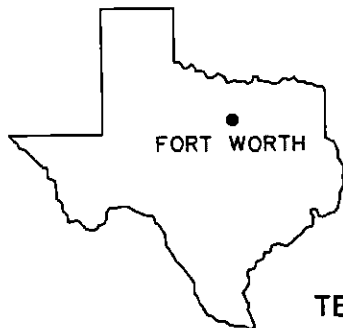
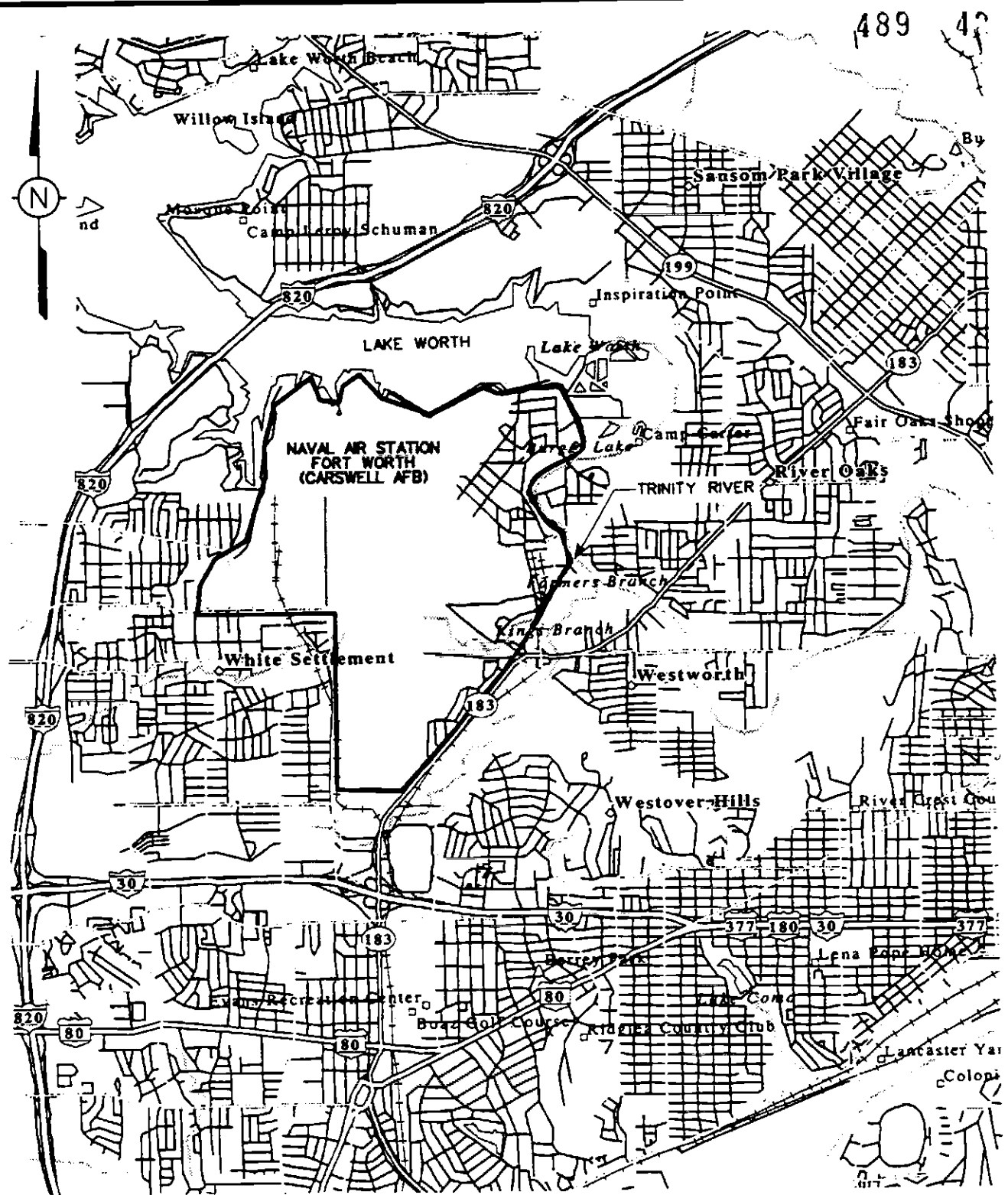


FIGURE 1
SITE LOCATION MAP

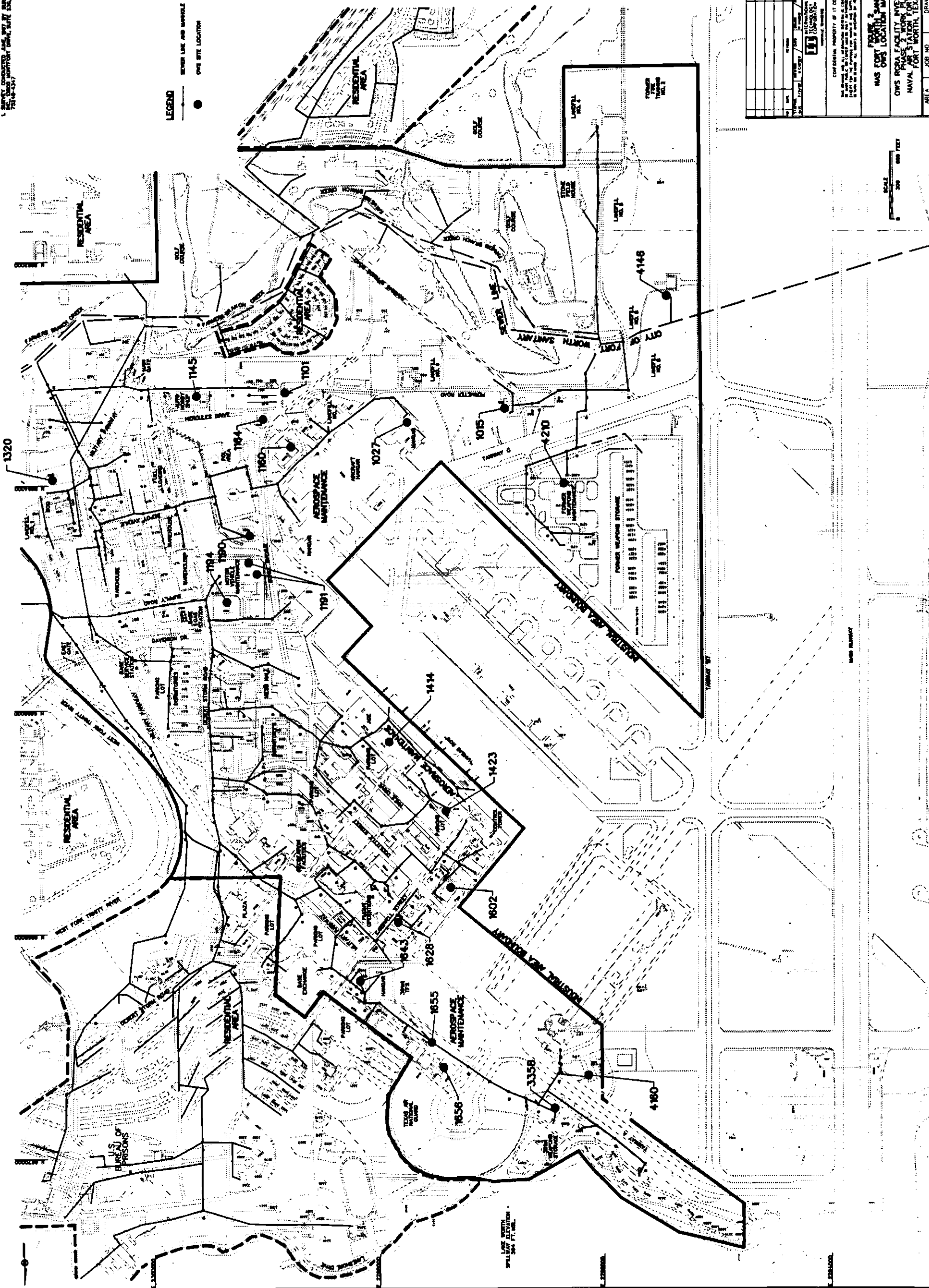
NAVAL AIR STATION FORT WORTH
FORT WORTH, TEXAS



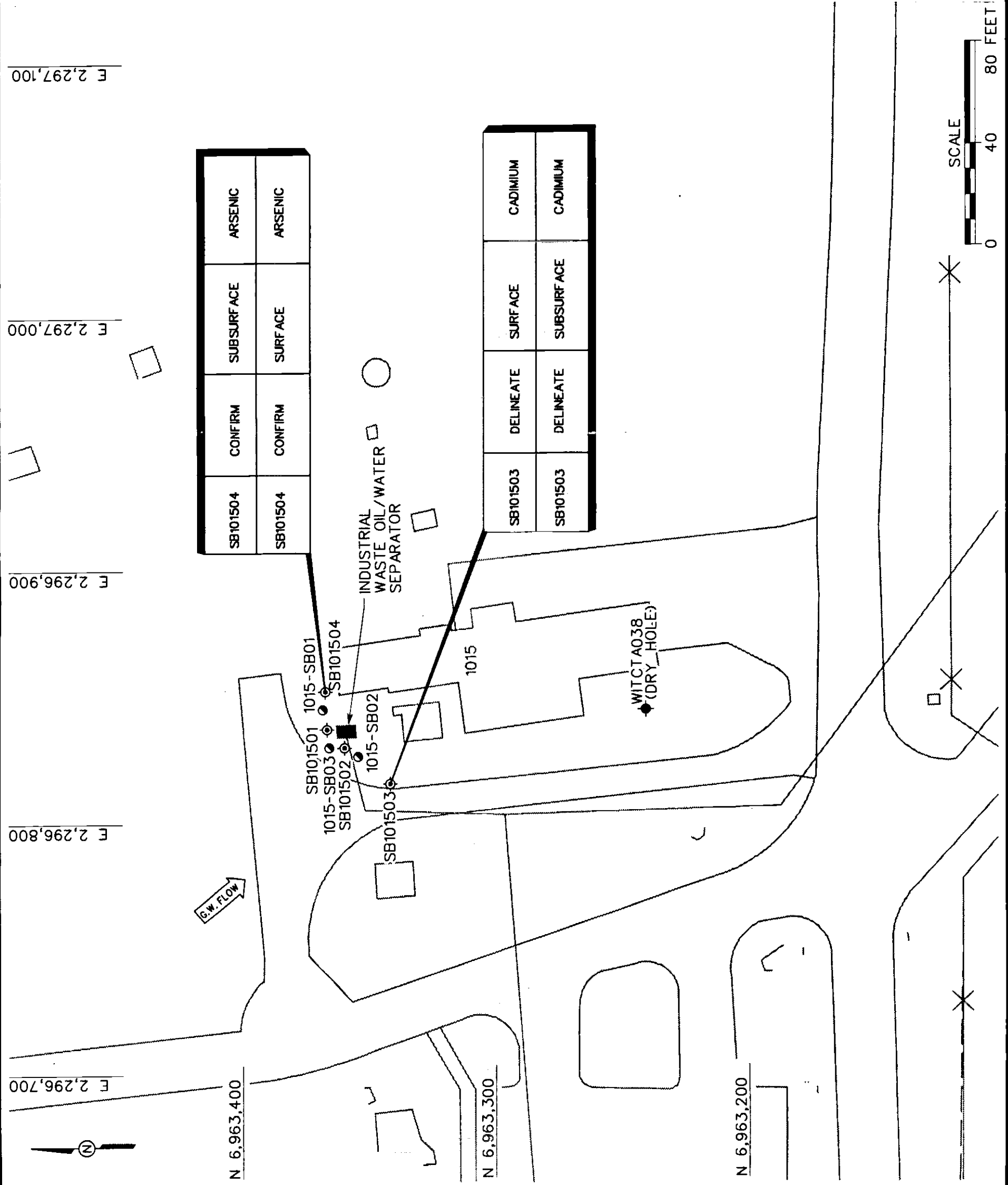
NOTES:

1. SURVEY CONDUCTED AND BY AIR SURVEY METHODS.
2. THIS MAP IS NOT TO BE USED FOR NAVIGATION.
3. (1:50,000)

LEGEND
SEWER LINE AND MANHOLE
ONE SITE LOCATION



CONFIDENTIAL PROPERTY OF IT CORPORATION THIS MAP IS NOT TO BE USED FOR NAVIGATION IT IS THE PROPERTY OF IT CORPORATION AND IS NOT TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM.	
DATE	11/1/77
BY	ITC
FOR	NAVY
PROJECT	OWS FACILITY INVESTIGATION
LOCATION	PHASE 2, WORK PLAN NORTH
AREA	NAVY, FORT WORTH, TEXAS
SHEET NO.	780579
DRAWING NO.	780579CS171



E 2,297,100

E 2,297,000

E 2,296,900

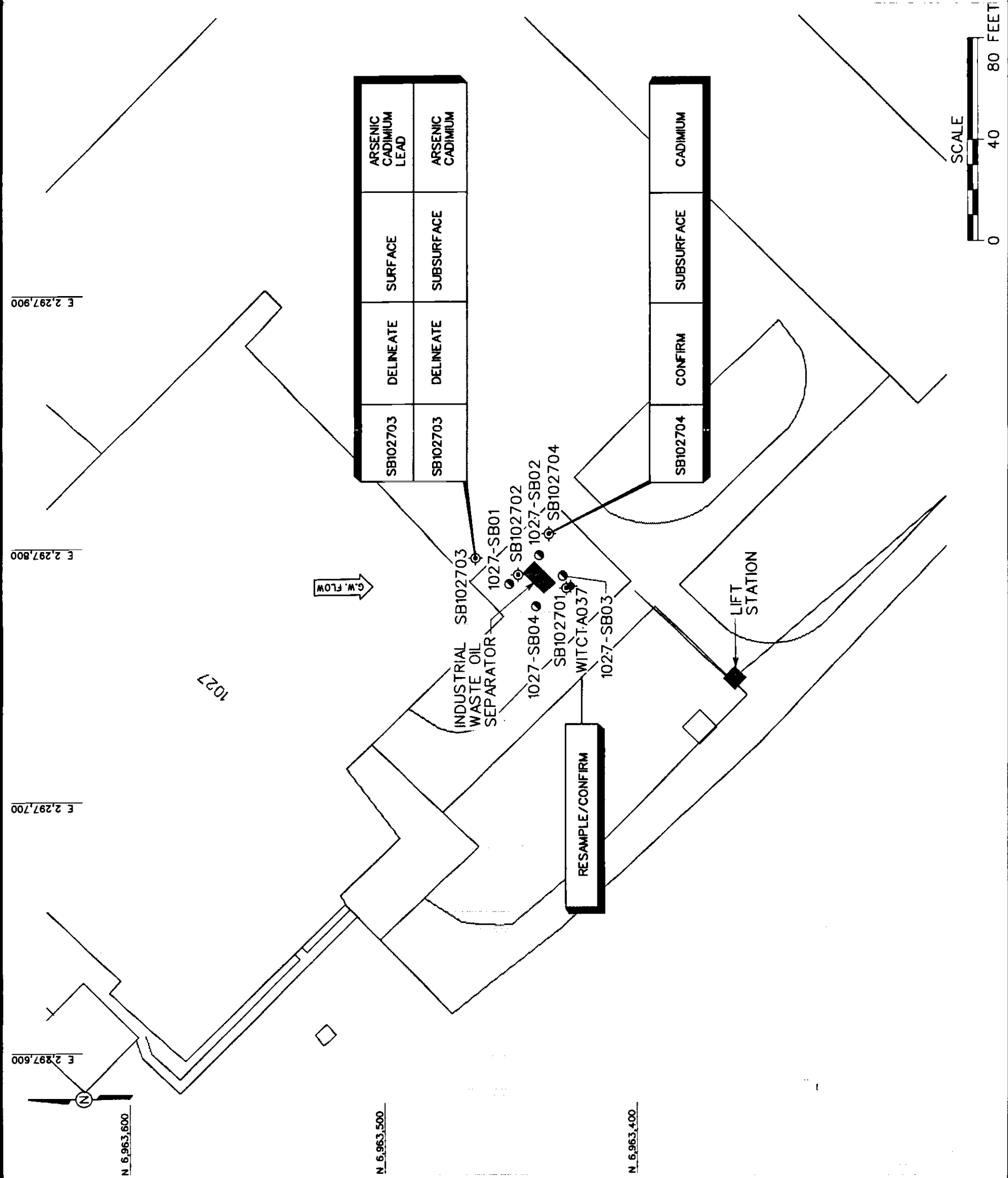
E 2,296,800

E 2,296,700

N 6,963,400

N 6,963,300

N 6,963,200



LEGEND

- SB102704

IT CORP. SOIL BORING
- IT CORP. MONITORING WELL
- 1064-SB01

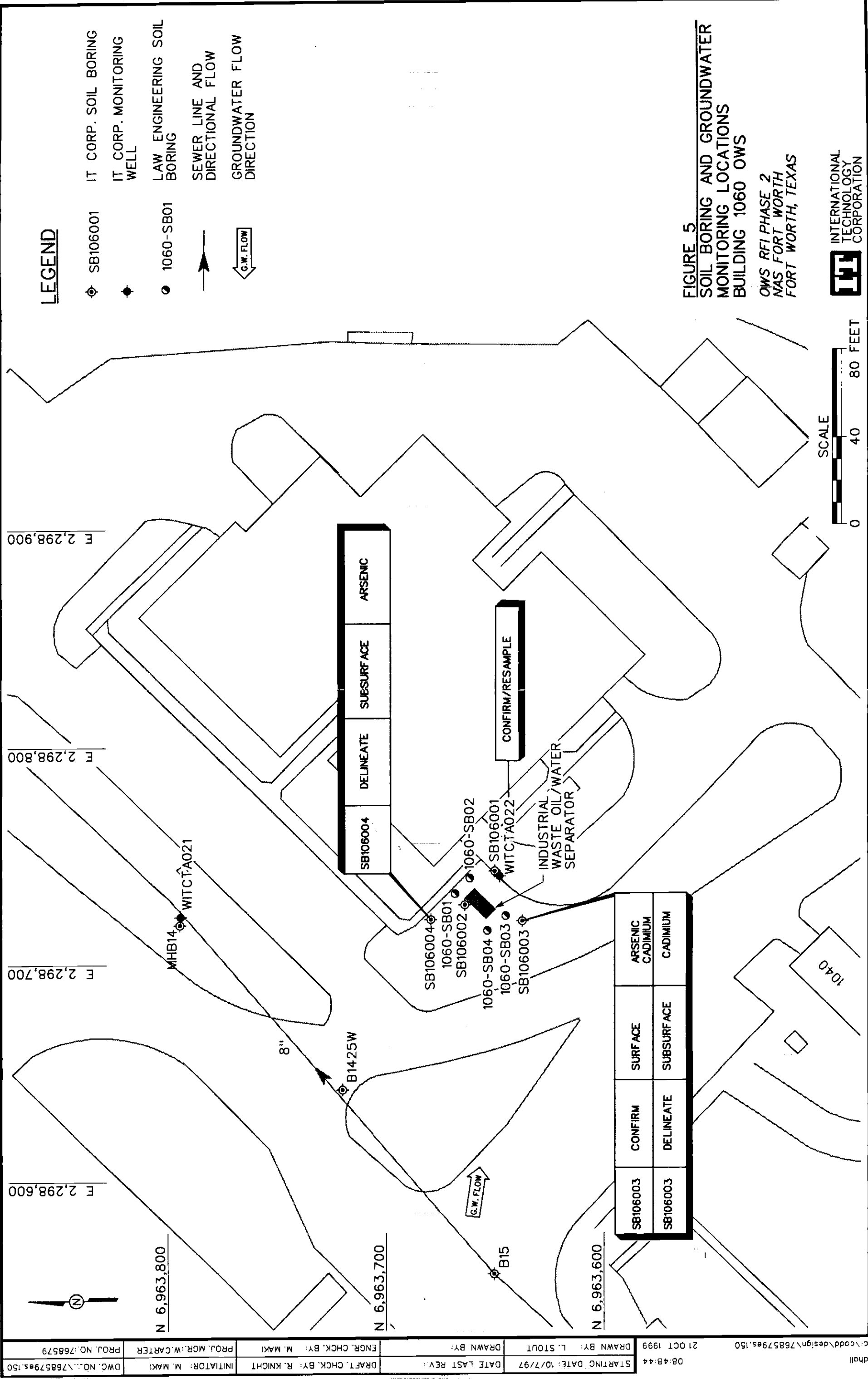
LAW ENGINEERING SOIL BORING
- G.W. FLOW

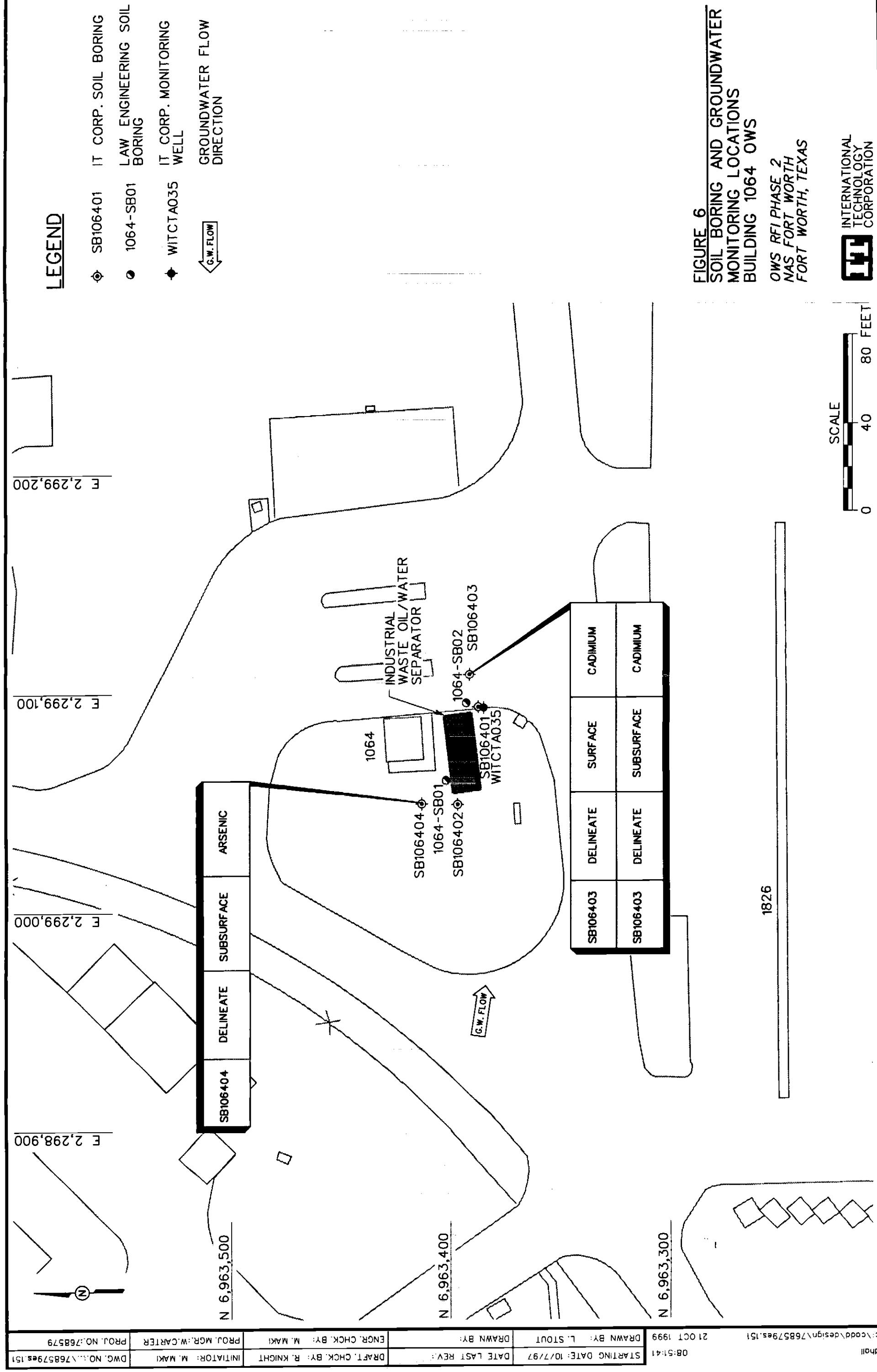
GROUNDWATER FLOW DIRECTION

FIGURE 4
SOIL BORING AND GROUNDWATER
MONITORING LOCATIONS
BUILDING 1027 OWS

OWS RFI PHASE 2
NAS FORT WORTH
FORT WORTH, TEXAS







11:02:04	c:\pcode\design\768579es.152	DRAWN BY: L. STOUT	21 OCT 1999
dhall			
STARTING DATE: 10/7/97	DATE LAST REV:	DRAFT. CHK. BY: R. KNIGHT	INITIATOR: M. MAKI
		ENGR. CHK. BY: M. MAKI	PROJ. MGR.: W. CARTER
			PROJ. NO.: 768579
			DWG. NO.: \768579es.152

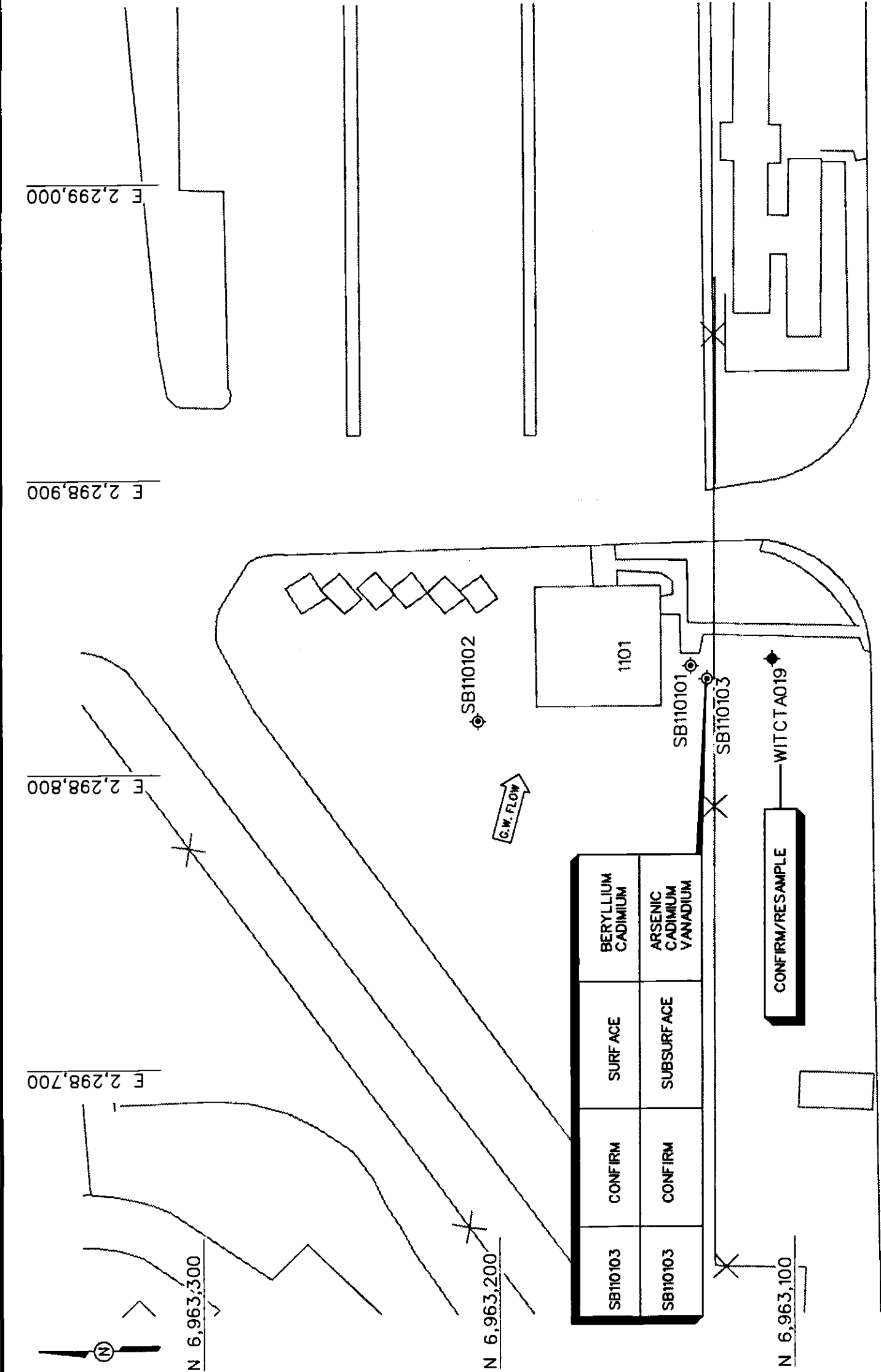


FIGURE 7
SOIL BORING AND GROUNDWATER
MONITORING LOCATIONS
BUILDING 1101 OWS
OWS RFI PHASE 2
NAS FORT WORTH
FORT WORTH, TEXAS

SCALE
0 40 80 FEET

INTERNATIONAL
TECHNOLOGY
CORPORATION

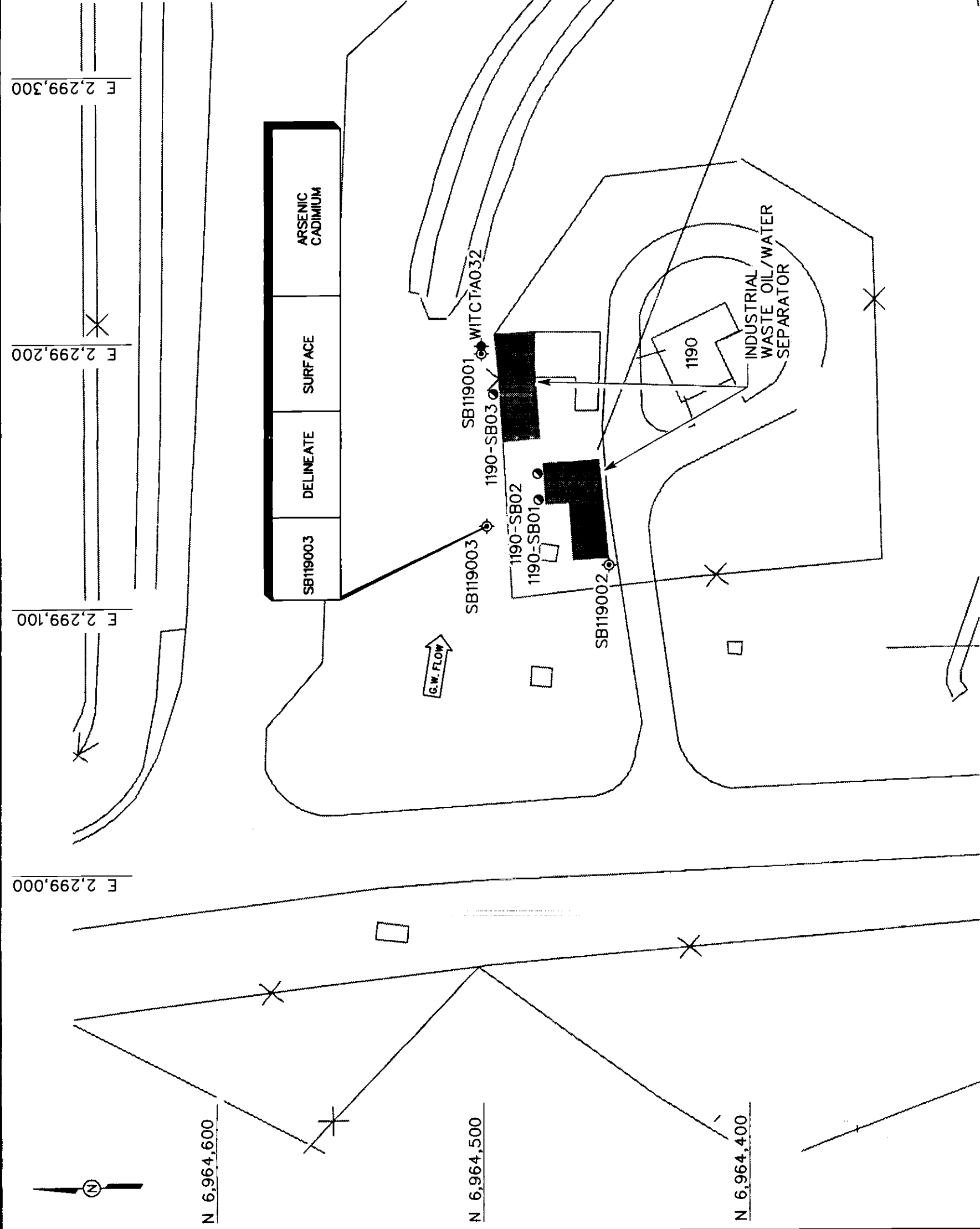
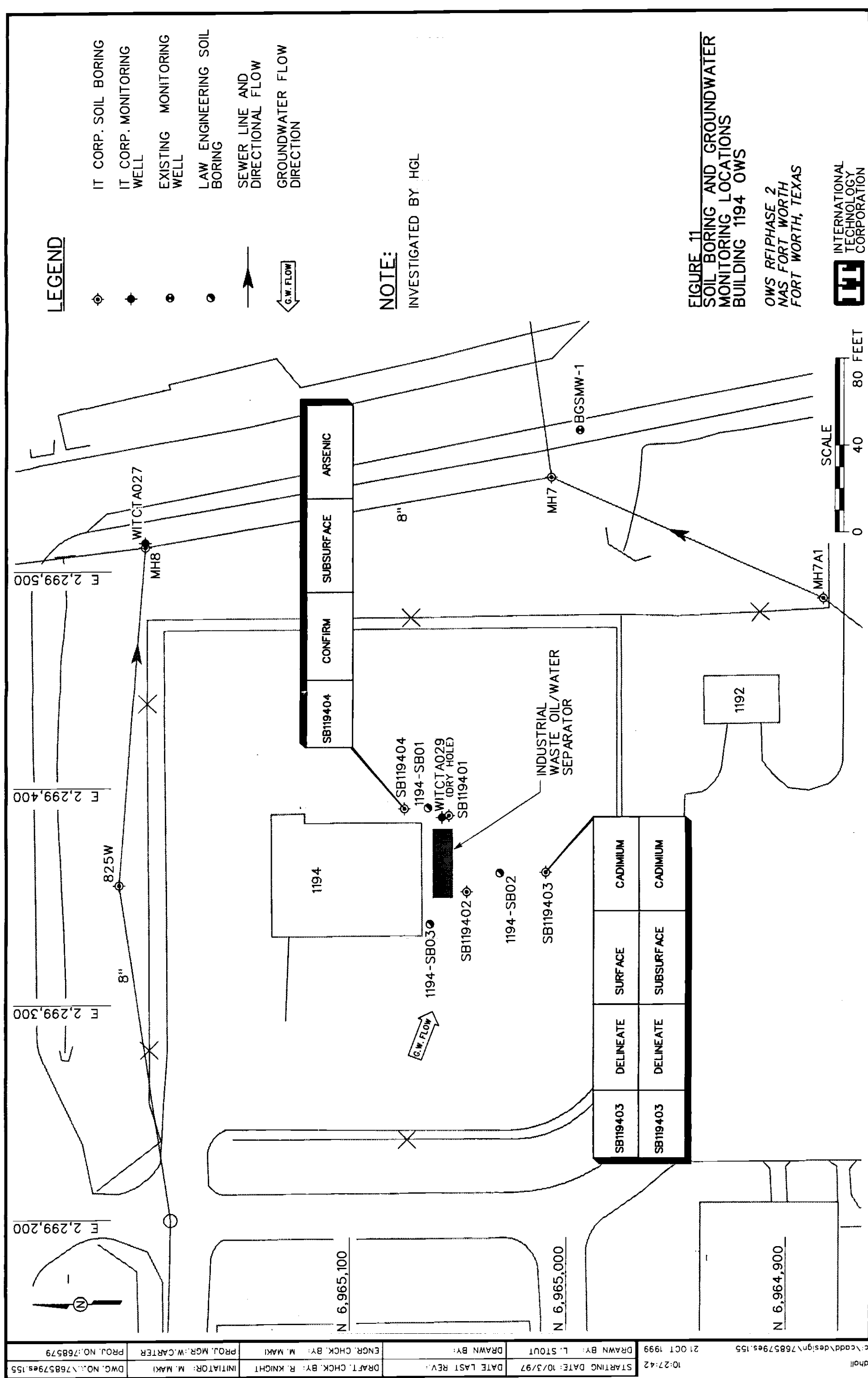


FIGURE 9
SOIL BORING AND GROUNDWATER
MONITORING LOCATIONS
BUILDING 1190 OWS
OWS RFIPHASE 2
NAS FORT WORTH
FORT WORTH, TEXAS



INTERNATIONAL
TECHNOLOGY
CORPORATION



10:32:37	STARTING DATE: 10/3/97	DATE LAST REV:	DRAFT, CHECK BY: R. KNIGHT	INITIATOR: M. MAKI	DWG. NO.: 768579es.156
21 OCT 1999	DRAWN BY: L. STOUT	ENGR. CHECK BY: M. MAKI	PROJ. MGR.: W. CARTER	PROJ. NO.: 768579	



LEGEND

- IT CORP. SOIL BORING
- IT CORP. MONITORING WELL
- EXISTING MONITORING WELL
- SEWER LINE AND DIRECTIONAL FLOW
- GROUNDWATER FLOW DIRECTION

NOTES:

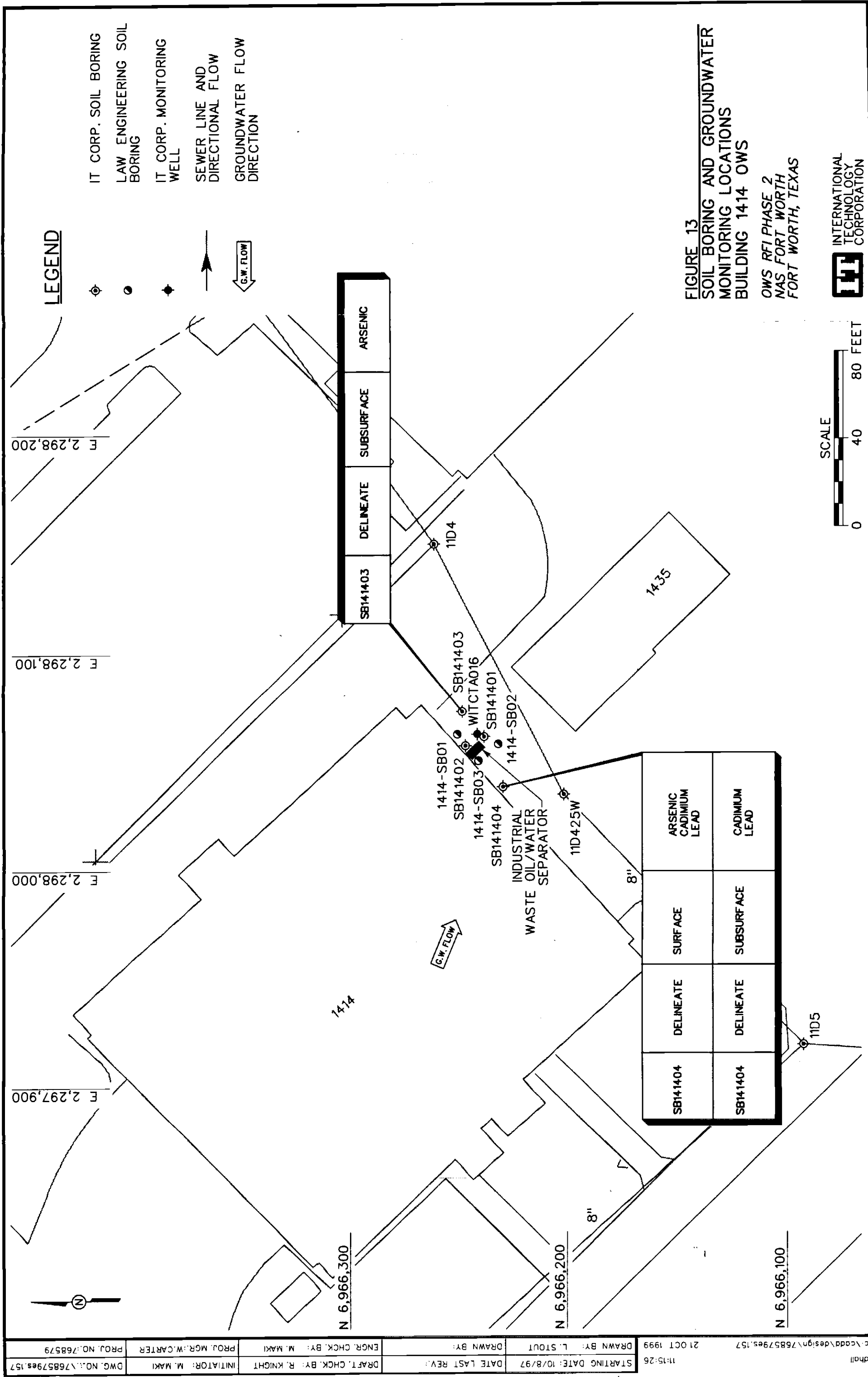
- NFA- TNRCC RRS1
- SUBMIT DEED RESTRICTION
- COMPLETE LEGAL SURVEY

FIGURE 12
SOIL BORING AND GROUNDWATER
MONITORING LOCATIONS
BUILDING 1320 OWS

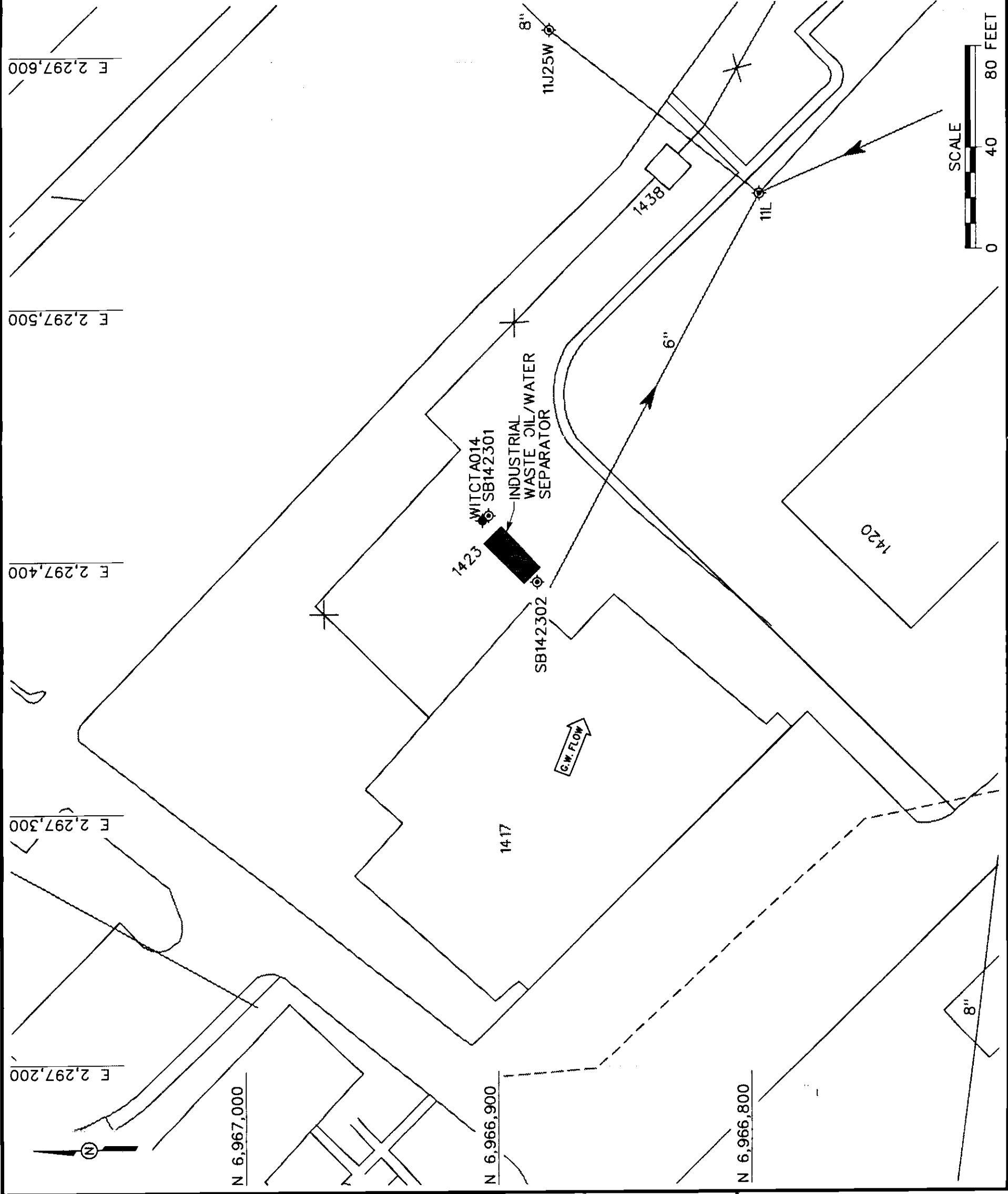
OWS RFI PHASE 2
NAS FORT WORTH
FORT WORTH, TEXAS



INTERNATIONAL
TECHNOLOGY
CORPORATION



11:09:45	STARTING DATE: 10/8/97	DATE LAST REV:	DRAFT, CHCK, BY: R. KNIGHT	INITIATOR: M. MAKI	DWG. NO.: 768579es.158
	DRAWN BY: L. STOUT	ENGR. CHCK, BY: M. MAKI	PROJ. MGR.: W. CARTER	PROJ. NO.: 768579	



LEGEND

- SB142301 IT CORP. SOIL BORING
- IT CORP. MONITORING WELL
- SEWER LINE AND DIRECTIONAL FLOW
- GROUNDWATER FLOW DIRECTION

NOTES:

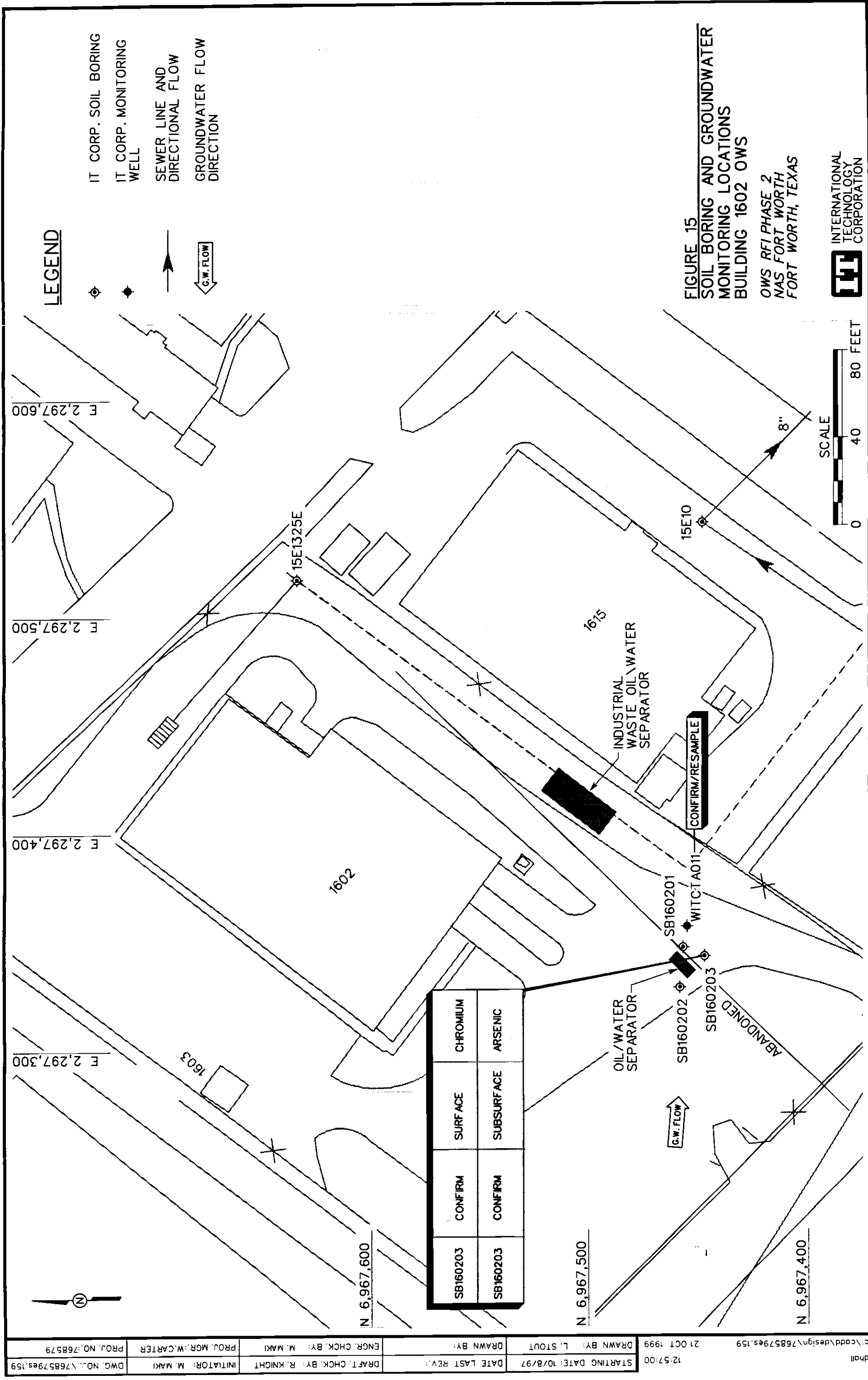
- NFA-TNRCC RRS1
- SUBMIT DEED RESTRICTION
- COMPLETE LEGAL SURVEY

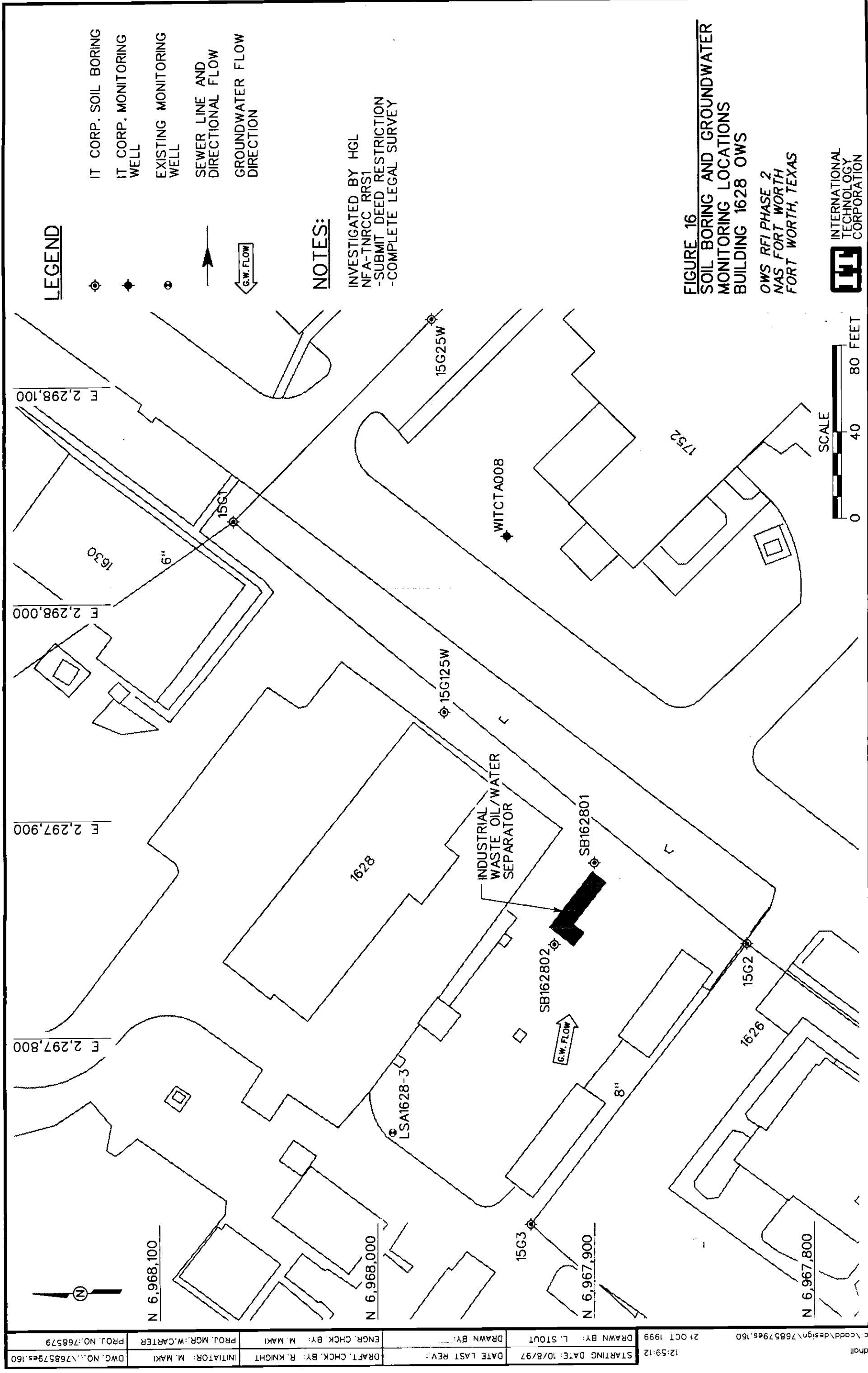
FIGURE 14
SOIL BORING AND GROUNDWATER
MONITORING LOCATIONS
BUILDING 1423 OWS

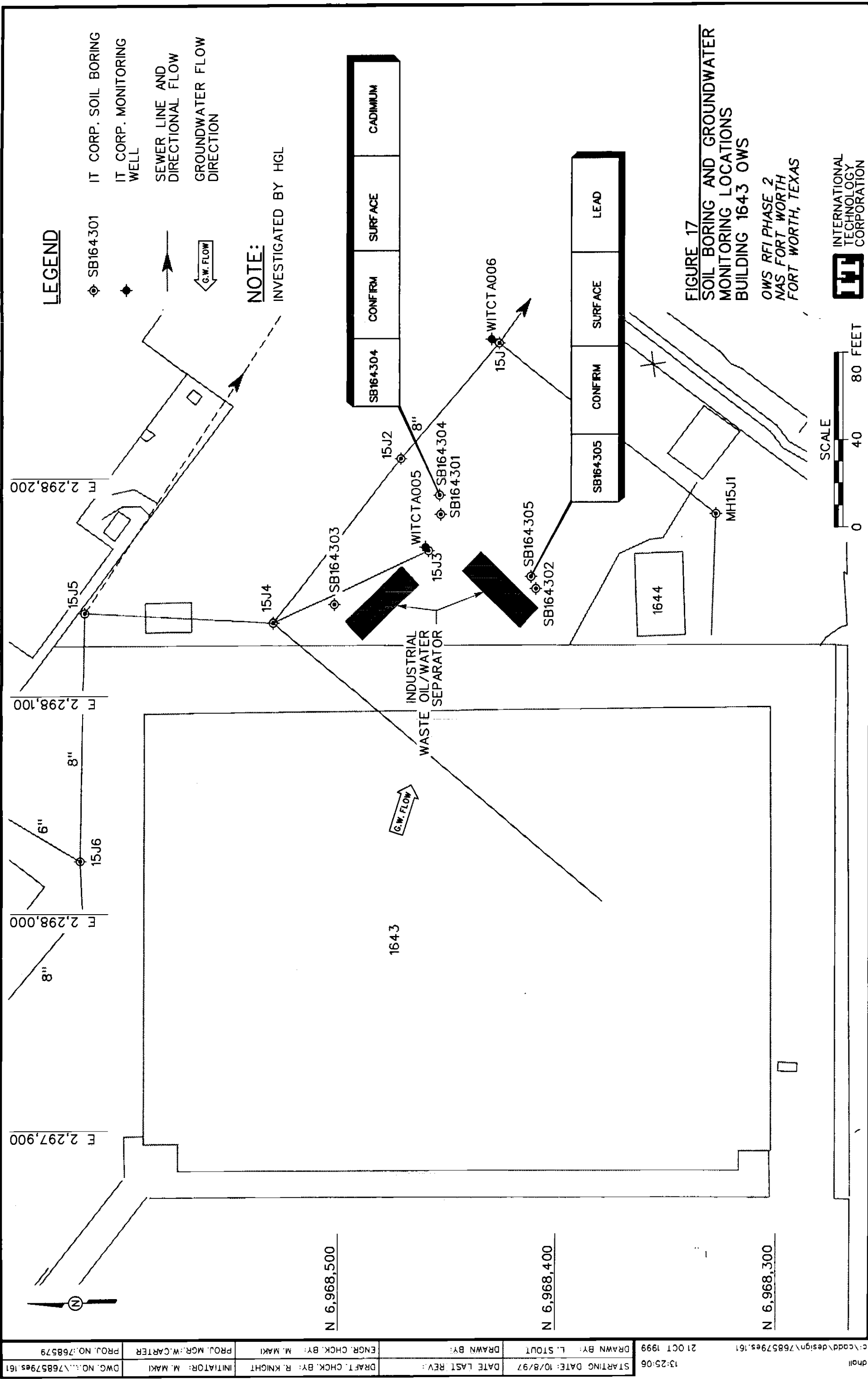
OWS RFI PHASE 2
NAS FORT WORTH
FORT WORTH, TEXAS



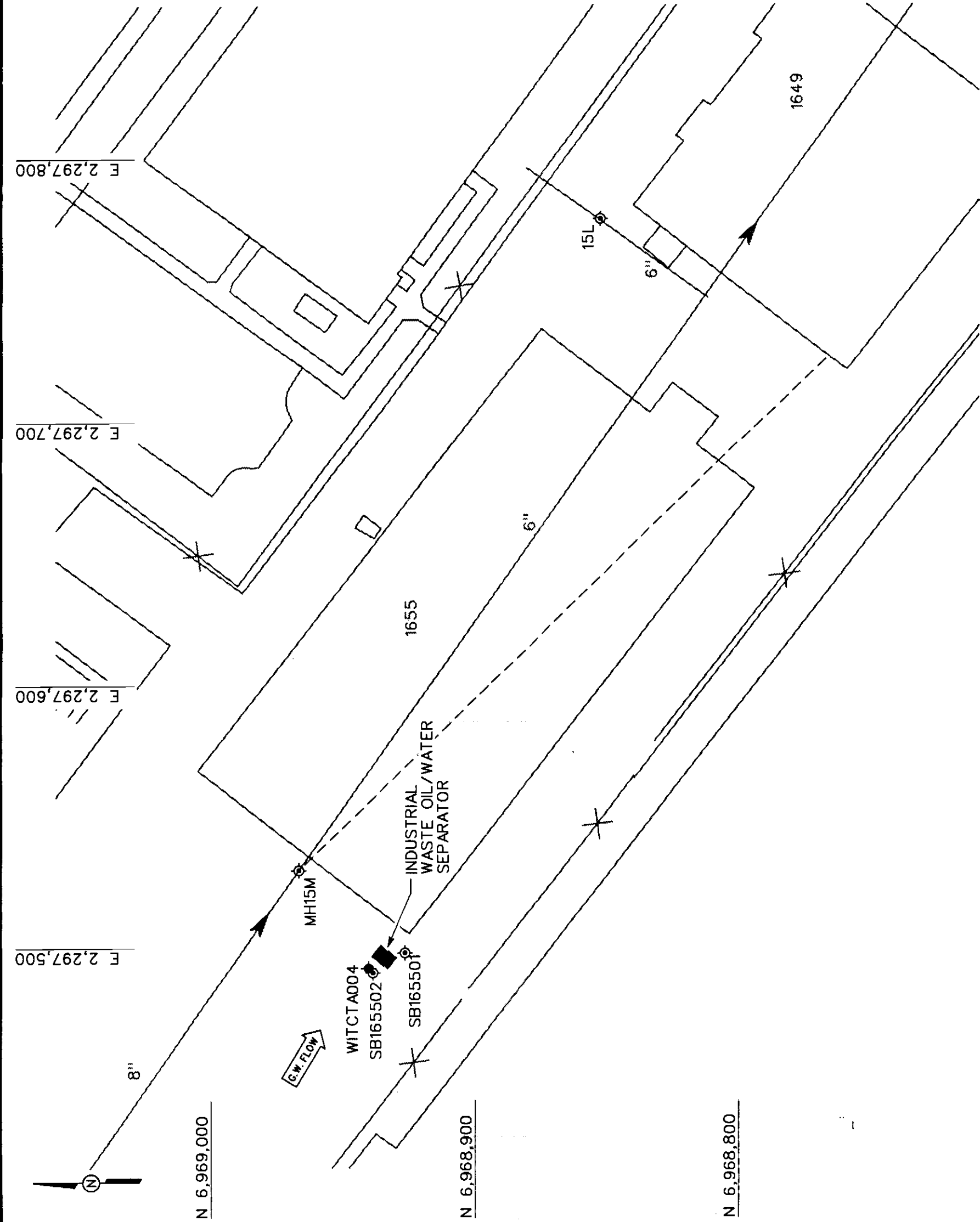
INTERNATIONAL
TECHNOLOGY
CORPORATION







13:26:42	STARTING DATE: 11/6/97	DATE LAST REV:	DRAFT, CHK, BY: R. KNIGHT	INITIATOR: M. MAKI	DWG. NO.: 768579es.162
c:\cadd\design\768579es.162	21 OCT 1999	DRAWN BY: R. KNIGHT	ENGR. CHK, BY: M. MAKI	PROJ. MGR.: W. CARTER	PROJ. NO.: 768579



LEGEND

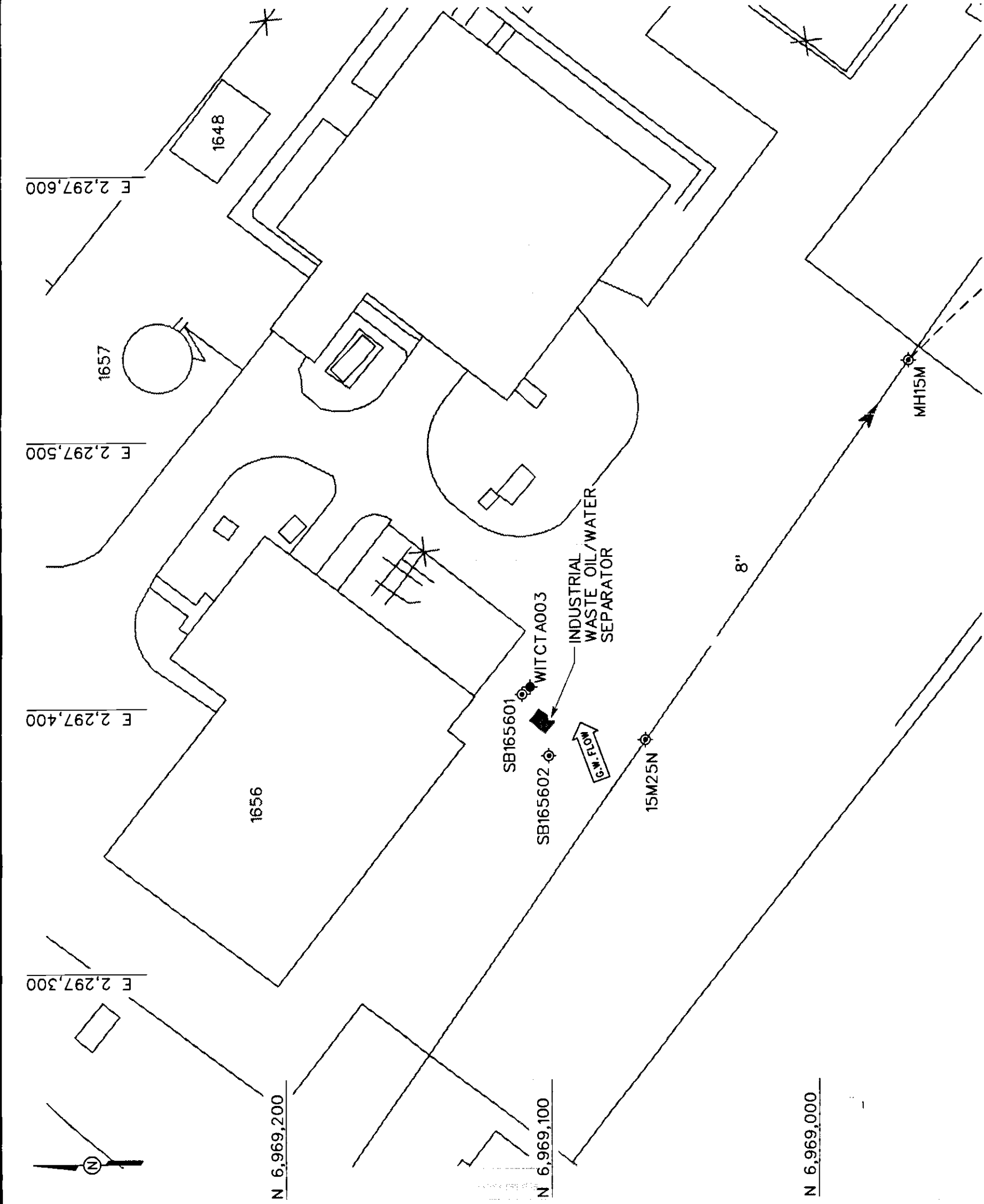
- IT CORP. SOIL BORING
- IT CORP. MONITORING WELL
- SEWER LINE AND DIRECTIONAL FLOW
- G.W. FLOW

NOTES:

- NFA-TNRCC RRS1
- SUBMIT DEED RESTRICTION
- COMPLETE LEGAL SURVEY

FIGURE 18
SOIL BORING AND GROUNDWATER
MONITORING LOCATIONS
BUILDING 1655 OWS
OWS RFI PHASE 2
NAS FORT WORTH
FORT WORTH, TEXAS

13:29:11	STARTING DATE: 11/7/97	DATE LAST REV:	DRAFT, CHK, BY: R. KNIGHT	INITIATOR: M. MAKI	DWG. NO.: 768579es.163
	DRAWN BY: R. KNIGHT	ENGR. CHK, BY: M. MAKI	PROJ. MGR.: W. CARTER	PROJ. NO.: 768579	



LEGEND

- SB164301 IT CORP. SOIL BORING
- IT CORP. MONITORING WELL
- SEWER LINE AND DIRECTIONAL FLOW
- GROUNDWATER FLOW DIRECTION

NOTES:

- NFA-TNRCC RRS1
- SUBMIT DEED RESTRICTION
- COMPLETE LEGAL SURVEY

FIGURE 19
SOIL BORING AND GROUNDWATER
MONITORING LOCATIONS
BUILDING 1656 OWS

OWS RFI PHASE 2
NAS FORT WORTH
FORT WORTH, TEXAS



13:33:15	STARTING DATE: 10/17/97	DATE LAST REV: 21 OCT 1999	DRAFT, CHCK, BY: R. KNIGHT	INITIATOR: M. MAKI	DWG. NO.: ...768579&5.164
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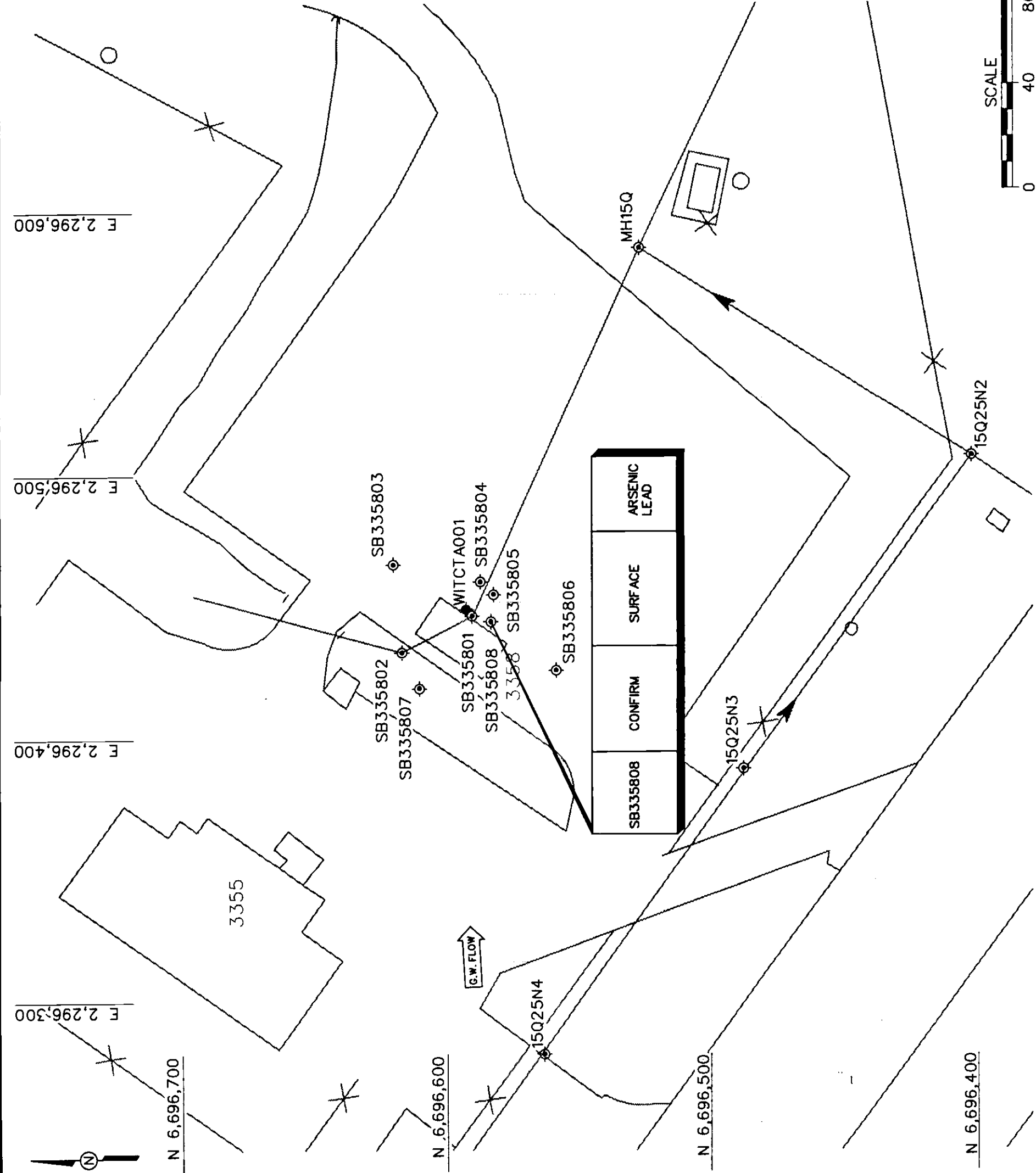
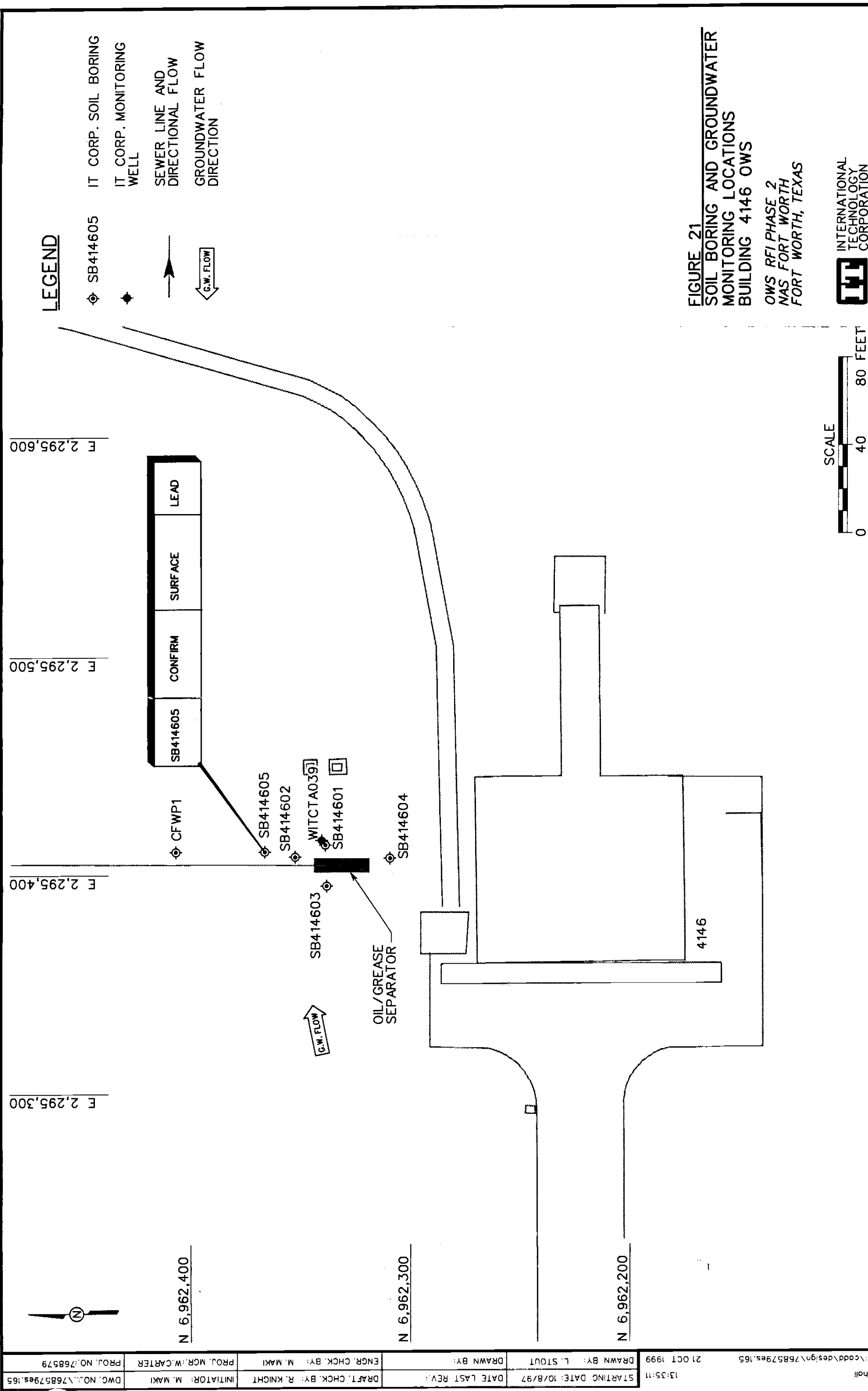
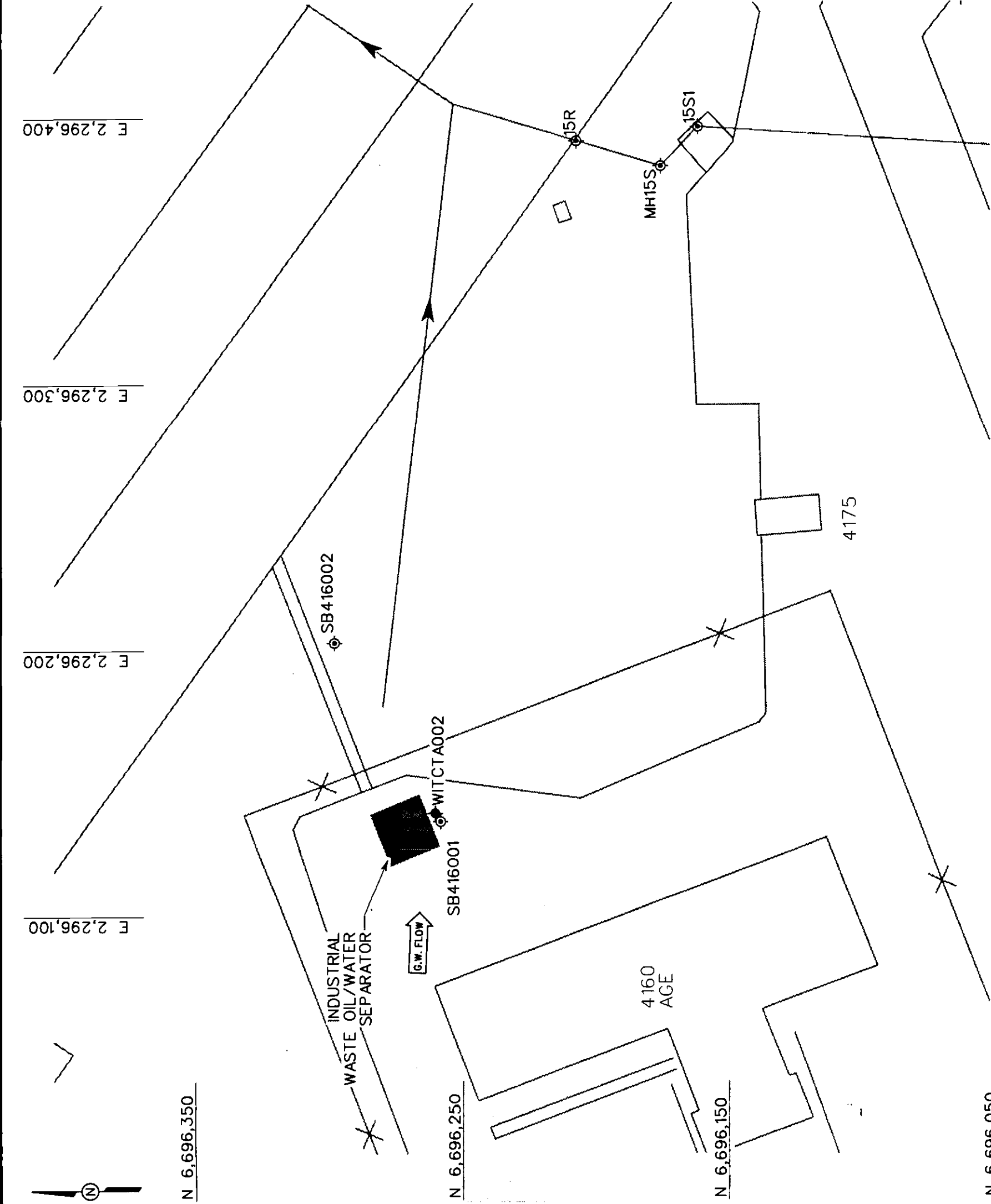


FIGURE 20
SOIL BORING AND GROUNDWATER
MONITORING LOCATIONS
BUILDING 3358 OWS
OWS RFI PHASE 2
NAS FORT WORTH
FORT WORTH, TEXAS

IT INTERNATIONAL
TECHNOLOGY
CORPORATION



14:36:24	STARTING DATE: 10/17/97	DATE LAST REV: 21 OCT 1999	DRAFT, CHCK, BY: R. KNIGHT	INITIATOR: M. MAKI	DWG. NO.: 768579es.166
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LEGEND

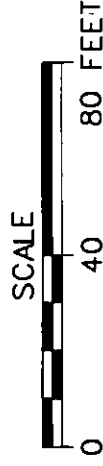
- IT CORP. SOIL BORING
- IT CORP. MONITORING WELL
- SEWER LINE AND DIRECTIONAL FLOW
- GROUNDWATER FLOW DIRECTION

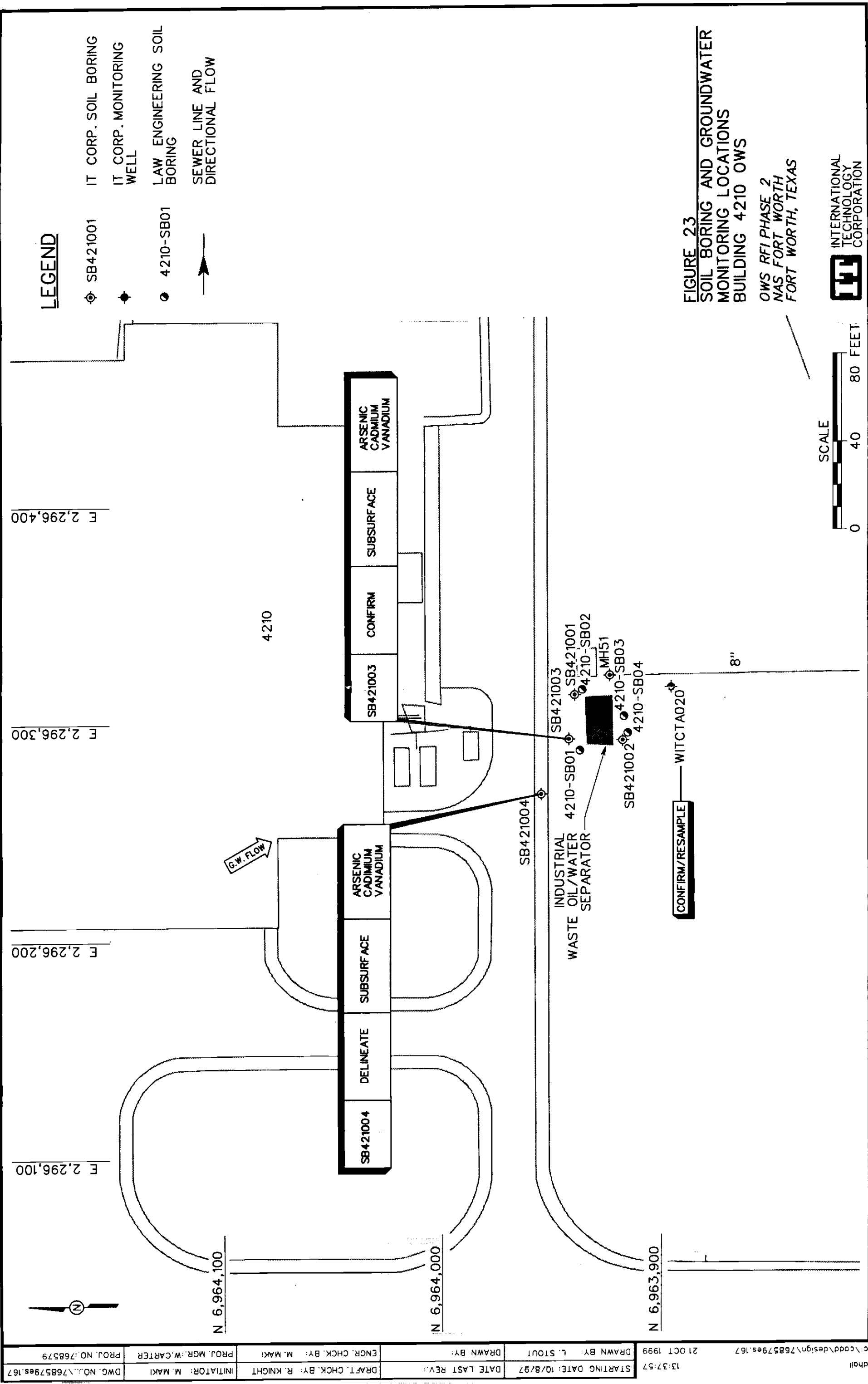
NOTES:

- NFA-TNRCC RRS1
- SUBMIT DEED RESTRICTION
- COMPLETE LEGAL SURVEY

FIGURE 22
SOIL BORING AND GROUNDWATER
MONITORING LOCATIONS
BUILDING 4160 OWS

OWS RFI PHASE 2
NAS FORT WORTH
FORT WORTH, TEXAS





List of Tables

List of Figures

List of Acronyms

1.0 Executive Summary

2.0 Introduction

3.0 Background and Existing Site Information

3.1 Site Description

3.2 Environmental Setting

3.2.1 Climate

3.2.2 Sensitive Habitats

3.2.3 Wetlands

3.2.4 Surface Waters

3.2.5 Geography and Physiography

3.2.6 Regional Geology

3.2.7 Hydrogeology

3.3 Site History and Operations

3.3.1 Ownership

3.3.2 Operation

3.3.3 Results of Previous Site Investigations

4.0 Summary of OWS Investigations (This will be shown by Building/OWS)

5.0 Development of Clean-Up Goals

6.0 Conclusions and Recommendations

6.1 Conclusions

6.2 Recommendations

Tables

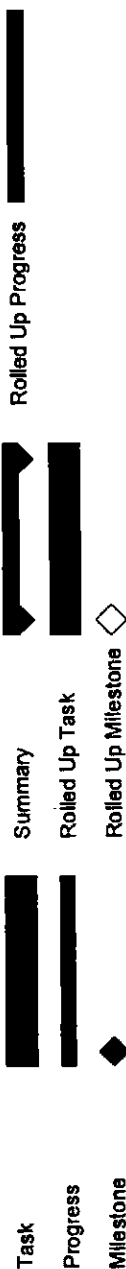
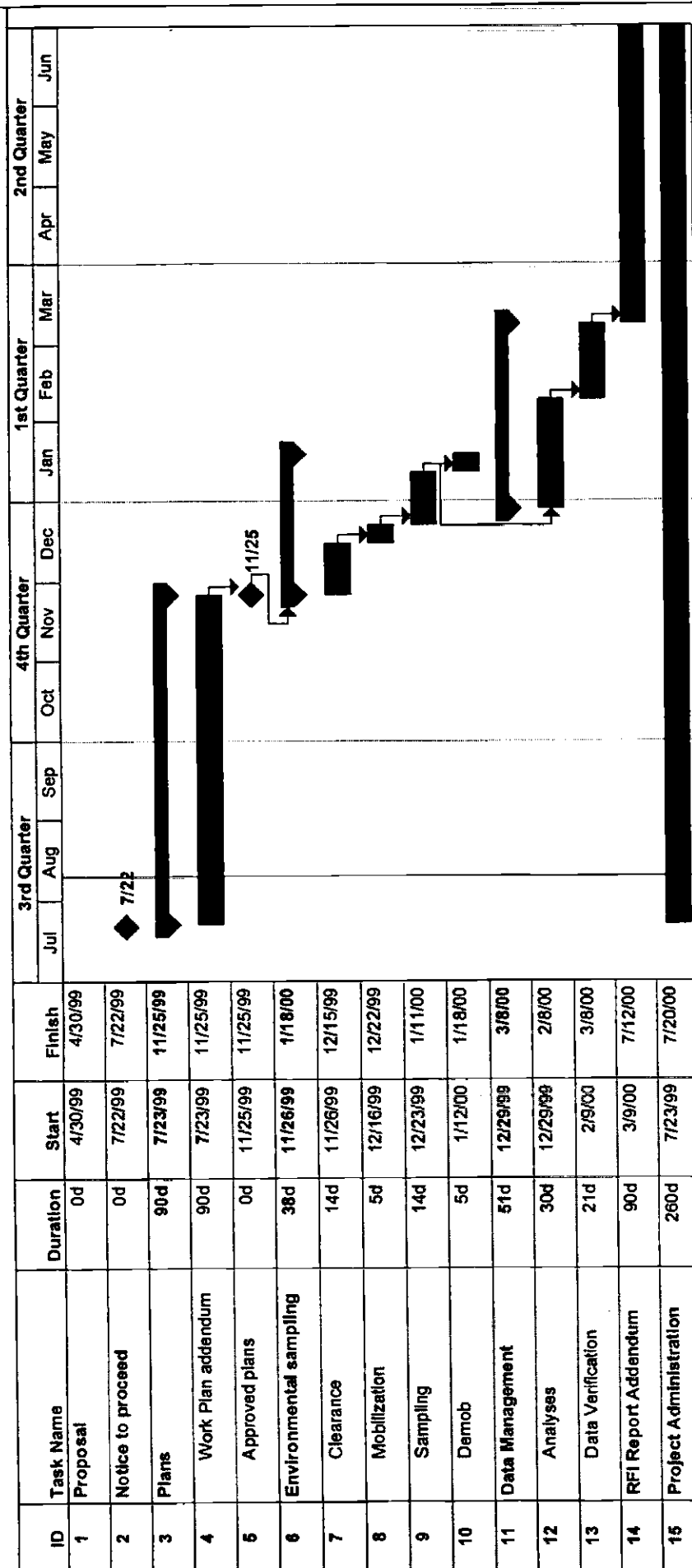
Figures

Appendix A - Oil/Water Separator Assessment Reports

Figure 24

OWS Phase 2 RFI Addendum Report Outline NAS Fort Worth, Texas

Figure 25
OWS Phase 2 Investigation
Carswell AFB



Project: OWS Carswell AFB
 Date: 8/10/99

Figure 25
OWS Phase 2 Investigation
Carswell AFB

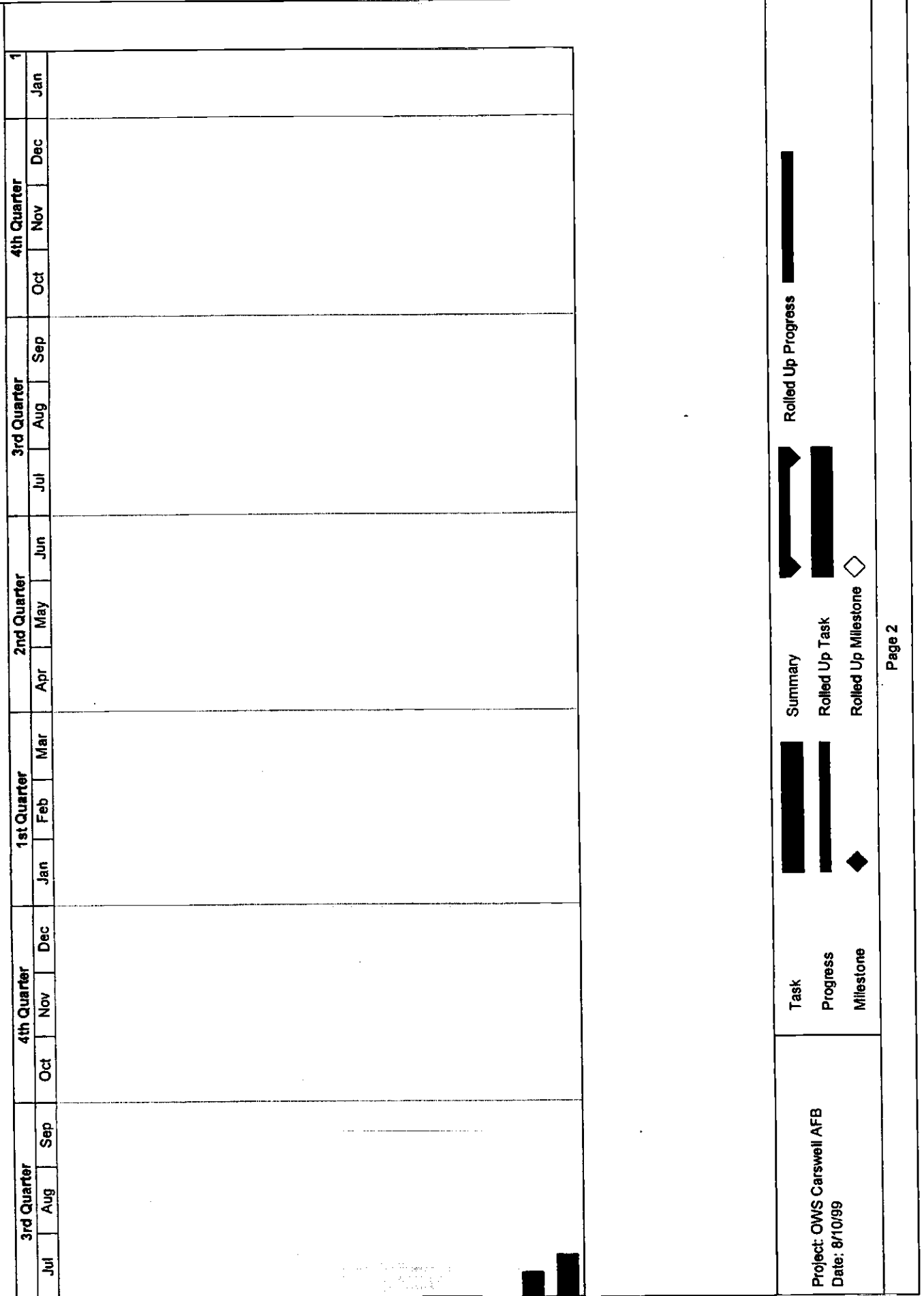
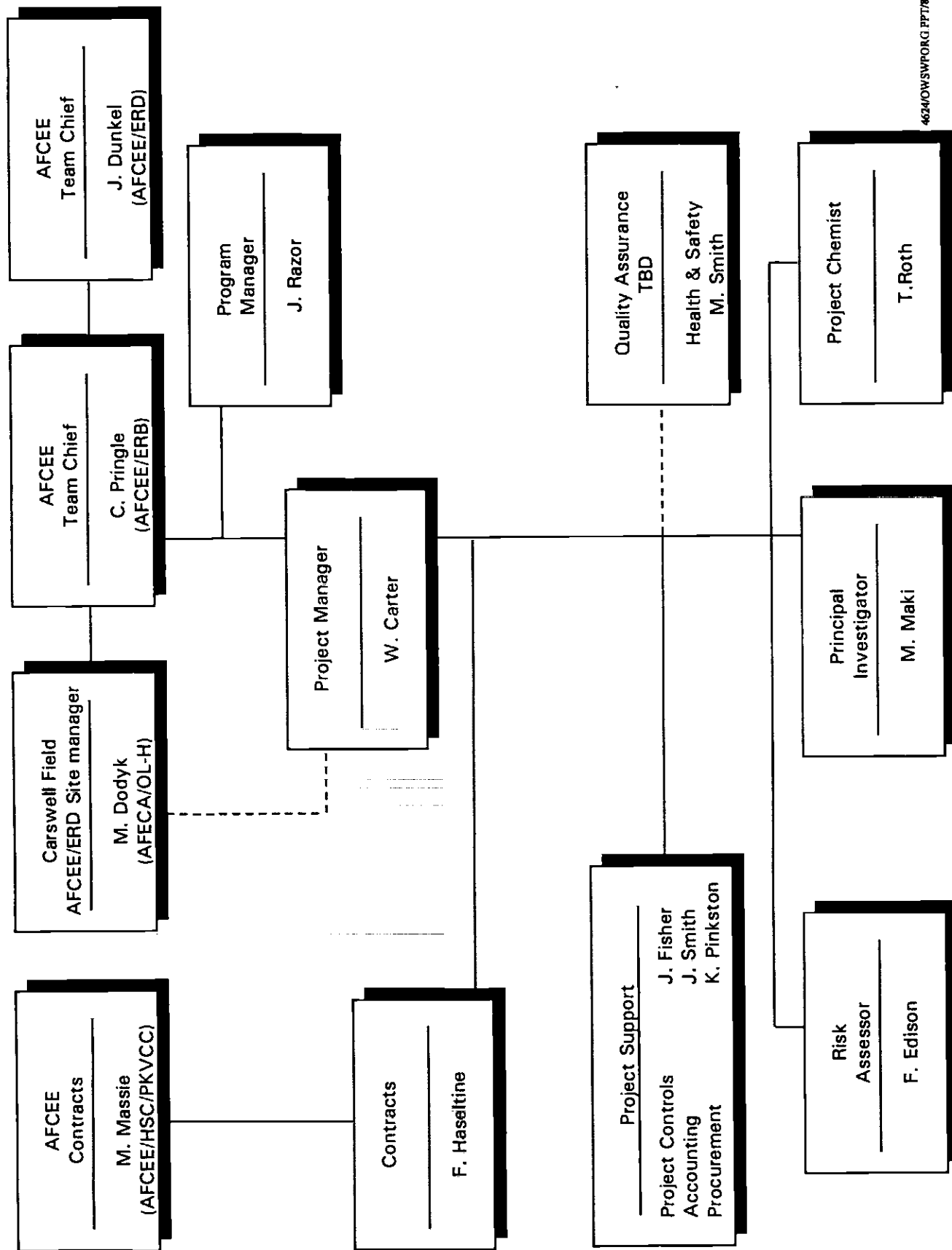


Figure 26. Project Organization - NAS Fort Worth (Project No. 768579)



FINAL PAGE

ADMINISTRATIVE RECORD

FINAL PAGE